

NASA SP-5021 (13)

**Index  
to  
NASA Tech Briefs  
1972**



**February 1973**

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**National Aeronautics and Space Administration**

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# Introduction

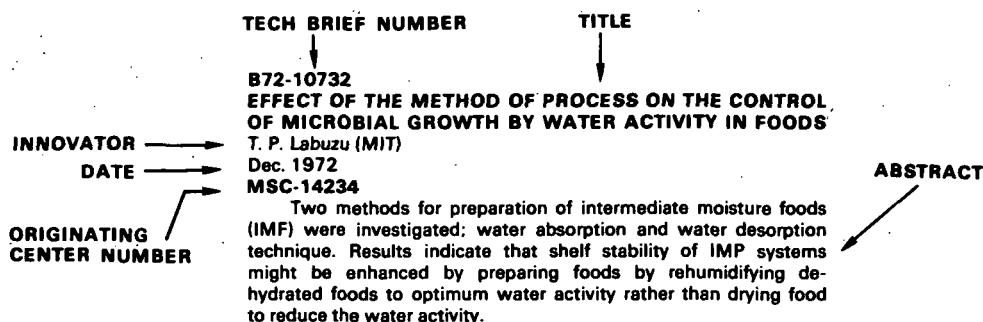
Tech Briefs are short announcements of new technology derived from the research and development activities of the National Aeronautics and Space Administration or the U.S. Atomic Energy Commission. These briefs emphasize information considered likely to be transferrable across industrial, regional, or disciplinary lines and are issued to encourage commercial application.

This *Index to NASA Tech Briefs* contains abstracts and four indexes—subject, personal author, originating Center, and Tech Brief number—for 1972 Tech Briefs.

## Abstract Section

The abstract section is divided into nine categories: Electronics/Electrical; Electronic/Electrical Systems; Physical Sciences; Materials/Chemistry; Life Sciences; Mechanics; Machinery, Equipment, and Tools; Fabrication Technology; and Computer Programs. Within each category, abstracts are arranged sequentially by Tech Brief number.

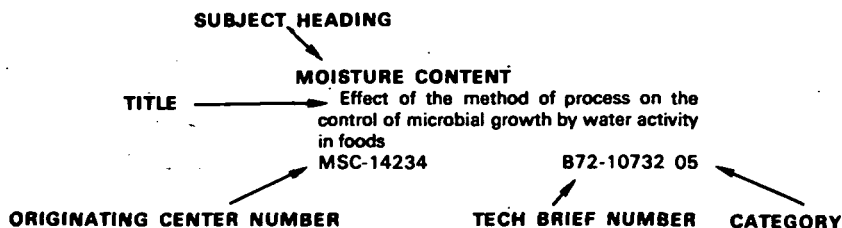
A typical abstract entry has these elements:



The originating Center number in each entry includes an alphabetical prefix that identifies the NASA Center or Atomic Energy Commission office where the Tech Brief originated. A list of prefixes and the corresponding Center names are given on page iii.

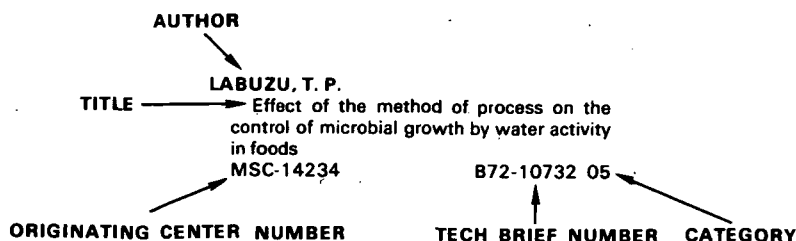
## Indexes

Four indexes are provided. The first is a subject index, arranged alphabetically by subject heading. Each entry in the subject index includes a Tech Brief number and a category number to aid the user in locating pertinent entries in the abstract section.



The preliminary edition of the *NASA Thesaurus* (December 1967) (NASA SP-7030) is used as the authority for the indexing vocabulary that appears in the subject index. The *NASA Thesaurus* should be consulted in examining the current indexing vocabulary, including associated cross-reference structure. Only the subject terms that have been selected to describe the documents abstracted in this issue appear in the subject index. Copies of the *NASA Thesaurus* may be obtained from the National Technical Information Service or the U.S. Government Printing Office at \$8.50 for the three-volume set. The first two volumes of this Thesaurus, consisting of the alphabetical listing of subject terms (A-Z), have been superseded by the following single-volume publication: *NASA Thesaurus Alphabetical Update* (September 1971) (NASA SP-7040), available from NTIS for \$6.00. (Volume III of the Preliminary Edition consists of the following ancillary aids to vocabulary selection: hierarchical display of index terms, category term listing, permuted index, and a listing of postable terms only.)

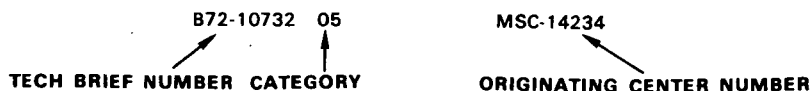
The second index is a personal author index. Entries in this index are arranged alphabetically by author's name. Tech Brief and category numbers are supplied to help the user find the appropriate entries in the abstract section.



The third index relates each originating Center number to the corresponding Tech Brief number and category. Entries in this index are arranged in alphanumeric order by Center number.



The fourth index relates each Tech Brief number to its originating Center number. Entries are arranged in ascending Tech Brief number order.





## Originating Center Prefixes

### NASA

ARC	Ames Research Center
GSFC	Goddard Space Flight Center
HQ	NASA Headquarters
KSC	Kennedy Space Center
LANGLEY	Langley Research Center
LEWIS	Lewis Research Center
M-FS	Marshall Space Flight Center
MSC	Johnson Space Center (formerly Manned Spacecraft Center)
NPO	NASA Pasadena Office
XAC	Ames Research Center
XGS	Goddard Space Flight Center
XLA	Langley Research Center

### Atomic Energy Commission

AEC	Atomic Energy Commission
ARG	Argonne National Laboratory
LRL	Lawrence Radiation Laboratory
NUC	AEC-NASA Space Nuclear Systems Office
SAN	Sandia Laboratories

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# Index to NASA Tech Briefs

February 1973

## Abstract Section

### 01 ELECTRONICS/ELECTRICAL

**B72-10007**

#### **PEAK ACCELERATION LIMITER**

C. P. Chapman

Dec. 1972

**NPO-10556**

Device is described that limits accelerations by shutting off shaker table power very rapidly in acceleration tests. Absolute value of accelerometer signal is used to trigger electronic switch which terminates test and sounds alarm.

**B72-10014**

#### **PIEZOELECTRIC TRANSDUCER MOSAIC**

R. C. Haborak (TRW Systems Group)

1972

**ARC-10509**

Crystal substrate is used to form a transducer mosaic by employing single X-cut crystal and transferring desired pattern from stainless steel mask. Result is a less tedious and costly method of producing a mosaic of matched crystals having the same fundamental frequency.

**B72-10021**

#### **BERYLLIUM THIN FILMS FOR RESISTOR APPLICATIONS**

O. Fiet (TRW Systems Group)

1972

**ARC-10485**

Beryllium thin films have a protective oxidation resistant property at high temperature and high recrystallization temperature. However, the experimental film has very low temperature coefficient of resistance.

**B72-10042**

#### **PSEUDO-SATURATING POWER CONVERTER**

R. G. Radys (Hughes Aircraft Co.) and C. V. Agnew (Hughes Aircraft Co.)

1972

**NPO-11368**

Relative performance of three basic configurations of electronic conversion units (saturating, pseudo-saturating, nonsaturating) requiring low power levels is compared. Pseudo-saturating mode exhibits best overall performance, nonsaturating a close second, saturating a poor third.

**B72-10043**

#### **DEEP SPACE NETWORK**

F. M. Flanagan, P. S. Goodwin, and N. A. Renzetti

1972 See also NASA-CR-12898

**NPO-11562**

Background, current status, and sites of Deep Space Network stations are briefly discussed.

**B72-10045**

#### **ELECTRICAL GROUNDING BRACKET**

C. E. Carroll (TRW Systems Group)

1972

**ARC-10041**

Device serves as common grounding point for shielded wires of multipin electrical connector and permits addition or removal of ground leads without disturbing other grounded wires.

**B72-10047**

#### **HIGH NOISE IMMUNITY ONE SHOT**

G. L. Schaffer

1972

**ARC-10137**

Multivibrator circuit, which includes constant current source, isolates line noise from timing circuitry and field effect transistor controls circuit's operational modes. Circuit has high immunity to supply line noise.

**B72-10054**

#### **PULSE EXCITATION OF BOLOMETER BRIDGES**

S. J. Rusk (Lockheed Missiles and Space Co.)

1972

**ARC-10292**

Driving bolometer bridge by appropriately phased excitation pulses increases signal-to-noise ratio of bolometer sensor which operates on a chopped light beam. Method allows higher applied voltage than is possible by conventional ac or dc excitation.

**B72-10055**

#### **TOPOLOGICAL SOLUTION OF BILATERAL SWITCHING NETWORKS**

L. Mazer

1972

**ARC-10294**

Topological method uses the eye as pattern detector to trace path of transmission on truth table. Pathway selection is continually supervised by logician, allowing him to seek planar iterative solution desirable for fabrication of monolithic circuits. Method applies to parity generators, multiple output functions, full adders, and bit comparators.

**B72-10056**

#### **COAXIAL INVERTED GEOMETRY EPITAXIAL TRANSISTOR**

R. J. Hruby, W. R. Dunn (Lockheed Missiles and Space Co.), and S. B. Cress (Lockheed Missiles and Space Co.)

1972

**ARC-10330**

Silicon transistor, developed for use in biotelemetry circuits, provides high current gain at low levels of power and voltage. Device operates from biopotential or miniature batteries and is suitable for incorporation into monolithic integrated circuits. Coaxial configuration and small size offer promise for high frequency application.

## 01 ELECTRONICS/ELECTRICAL

**B72-10057**

### **CIRCUIT PERMITS INDEPENDENT ADJUSTMENT OF GAIN AND OFFSET AT CONSTANT INPUT IMPEDANCE**

V. B. Holland

1972

**ARC-10348**

Circuit with single operational amplifier conditions input signals for data acquisition systems by applying offset voltage correction signal to feedback circuit instead of one of the input terminals of operational amplifier.

**B72-10059**

### **IMPROVED AUDIO REPRODUCTION SYSTEM**

C. S. Chang (Lockheed Missiles and Space Co.)

1972 See also NASA-CR-114287

**ARC-10404**

Circuitry utilizing electrical feedback of instantaneous speaker coil velocity compensates for loudspeaker resonance, transient peaks and frequency drop-off so that sounds of widely varying frequencies and amplitudes can be reproduced accurately from high fidelity recordings of any variety.

**B72-10060**

### **LIGHTWEIGHT, BROAD-BAND SPECTRUM ANALYZER**

G. M. Crook (TRW Systems Group)

1972

**ARC-10406**

Spectrum analyzer, utilizing techniques similar to those used to classify energy levels of nuclear particles, is incorporated into electric field detector. Primary advantage is ability to perform qualitative broad-band frequency analysis over a large dynamic amplitude range with minimum weight and electrical power requirements.

**B72-10077**

### **VOLTAGE-TUNABLE PARALLEL-T FILTER FOR REMOTE OPERATION**

R. E. Brantner

1972

**NPO-11165**

Filter is devised by using insulated-gate field-effect transistors for remote control. Transistors are P-channel devices that operate in enhancement mode and are commercially available.

**B72-10079**

### **CIRCUIT CONTROLS TURN-ON CURRENT**

K. G. Holmes

1972

**NPO-11339**

Single choke used in primary circuit with diode arrangement, maintaining dc current flow through choke and setting up a unidirectional magnetic field, limits turn-on current of transformer-rectifier power supply. Technique reduces number and weight of components and minimizes effect of initial inrush surge current on source.

**B72-10080**

### **WIDE ANGLE SOLAR SENSOR**

L. F. Schmidt and W. E. Crawford

1972

**NPO-11341**

Method for correcting orientation of spacecraft with respect to sun is discussed. System consists of two photocells on either side of sensor. When photocells are evenly illuminated, no output is made from sensor. When photocells are unevenly illuminated, sensor sends signal to gas jets to change orientation.

**B72-10092**

### **PRECISION VOLTAGE REGULATOR**

P. J. Hand and R. A. Crawford

1972

**NPO-11502**

Balanced positive and negative voltage output circuit, in which error voltage for control is developed from difference in absolute value of positive and negative voltages referenced to a common point, regulates voltage for use with inertial reference unit.

Fast-acting, temperature-compensated, high-gain operational amplifier circuits maintain common point.

**B72-10096**

### **PIEZOELECTRIC ACTUATOR USES SEQUENTIALLY-EXCITED MULTIPLE ELEMENTS: A CONCEPT**

E. E. Sabelman

1972

**NPO-11527**

Utilizing arrays of sequentially-excited piezoelectric elements to provide motion in a nonmagnetic motor provide built-in redundancy and long life required for deployment or actuation of devices on spacecraft. Linear-motion motor devices can also be fabricated.

**B72-10100**

### **STABLE PHOTSENSOR AMPLIFIERS**

H. Fujimoto

1972

**NPO-11561**

Minimization of common mode effects in differential amplifier arrangement which processes signals from two high impedance photosensors is achieved by connecting one photosensor in feedback loop of amplifier and using field effect transistors in the input circuit.

**B72-10102**

### **SIGNAL TO NOISE MEASUREMENT CIRCUIT**

L. F. Deerkoski

May 1972

**GSFC-11239**

Phase lock reference provides a rapid and accurate method of determining the signal-to-noise ratio at the intermediate frequency stage of a receiver.

**B72-10103**

### **LONGITUDINAL FRICTION FORCES IN PIPING DESIGN**

C. S. Parker (GE)

May 1972

**M-FS-13754**

Scheme measures sliding support friction forces and incorporates them into software programs which are used to analyze piping flexibility.

**B72-10106**

### **TORNADO DETECTOR AND ALARM**

A. R. Moss

May 1972

**M-FS-20915**

Automatic device which attaches to an active television set sounds an audible alarm when a tornado is within 29 km (18 miles) of device.

**B72-10112**

### **FLEXIBLE DESK TOP COMPUTERS USING LARGE SCALE INTEGRATION (L.S.I.) CHIPS**

H. Garrett and R. C. Asquith

1972

**M-FS-21277**

Microprogrammable modular computer utilizing only seven different types of L.S.I. elements lowers manufacturing cost and improves reliability. Chips can be standardized and used to implement variable bit length computers.

**B72-10116**

### **TIME-ADJUSTED VARIABLE RESISTOR**

R. C. Heyser

Dec. 1972

**NPO-11306**

Timing mechanism was developed effecting extremely precisioned highly resistant fixed resistor. Switches shunt all or portion of resistor; effective resistance is varied over time interval by adjusting switch closure rate.

**B72-10124**

### **FREQUENCY SWITCH KEYED OSCILLATOR**

L. Katchis (Randonics, Inc.)  
1972

**ARC-10412**

Oscillator changes resonant frequency of the LC tank circuit by shunting one of a pair of parallel capacitors. Technique reduces amount of hardware required to interrogate and control remote systems.

**B72-10134**

**HIGH-TEMPERATURE, LONG-LIFE THYRATRON**

E. A. Baum (GE) and N. D. Jones (GE)  
May 1972 See also B69-10376; NASA-CR-1684  
**LEWIS-11327**

Thallium and xenon filled thyatron was developed that operates at tube envelope temperatures up to 750 C. This tube performs at peak voltage ratings of 2000 V forward and reverse and at an average current rating of 15 A for up to 11,000 hours.

**B72-10138**

**COMPENSATION OF VOLTAGE DROPS IN SOLID-STATE SWITCHES USED WITH THERMOELECTRIC GENERATORS**

K. Shimada  
Dec. 1972

**NPO-11388**

Seebeck effect solid state switch was developed eliminating thermoelectric generator switch voltage drops. Semiconductor switches were fabricated from materials with large Seebeck coefficients, arranged such that Seebeck potential is generated with such polarity that current flow is aided.

**B72-10145**

**A RELIABLE LIQUID HELIUM DETECTOR**

W. M. Krawczonek and B. Stephenson  
May 1972  
**LEWIS-11487**

Detector and indicator system, utilizing commercial perforated germanium cryogenic thermometer as level sensor containing adjustable level discriminator with indicators, operates reliably over pressure range from 50 to 900 mm Hg without electronic adjustments.

**B72-10149**

**GATE PROTECTIVE DEVICE FOR INSULATED GATE FIELD-EFFECT TRANSISTORS**

R. A. Sunshine (RCA)  
May 1972  
**M-FS-21626**

Device, which protects insulated gate field-effect transistors, improves reliability through utilization of layers of conductive material on top of each alternating semiconductor material region. Separation of layers is necessary to prevent shorting out junctions between alternating regions.

**B72-10155**

**CRYSTAL-CONTROLLED MULTIVIBRATOR**

R. C. Schober  
Dec. 1972  
**NPO-11627**

Method is described for designing crystal oscillator which has frequency and symmetry stability suitable for system-clock-generators used in spacecraft data systems. Simple multivibrator is used in which timing capacitor is replaced by a crystal.

**B72-10156**

**SELECTING DIGITAL FILTERS**

R. E. DeMandel (Lockheed Missiles and Space Co.) and S. J. Krivo (Lockheed Missiles and Space Co.)  
May 1972  
**M-FS-20933**

Technique reduces task of filter design by using cut off frequency, termination frequency and weight number to determine filter effect on frequency domain of digital filter input data function.

**B72-10159**

**ZIPPER-TYPE ELECTRICAL CONNECTORS**

C. E. Levoe  
Dec. 1972

**NPO-11639**

Electrical connector is described of zipper-like configuration, in which sequentially interlocking tines serve as electrical contacts or insulators.

**B72-10165**

**DIFFERENTIAL INPUT PREAMPLIFIER**

P. W. Callaway (Santa Barbara Res. Center)  
1972

**ARC-10489**

Preamplifier chops and amplifies very low level output of thermopile infrared detectors that will be used to measure thermal energy flux of Jupiter and its departure from a blackbody spectrum. Output signal has negligible phase shift. AC signal is RC-coupled to input stage of other amplifiers.

**B72-10176**

**LONG-TERM DRIFT OF THERMOCOUPLES AT 1600 K**

G. E. Glawe  
May 1972 See also NASA-TN-D-7027  
**LEWIS-11471**

Thermal electromotive-force changes for 30 commercially available noble- and refractory-metal thermocouples have been determined in air, argon, and vacuum, at 1600 K for exposures up to 10,000 hours. Investigation techniques can serve as guidelines for future studies of other thermocouple systems.

**B72-10181**

**IMPROVED HIGH VOLTAGE INSULATOR FOR USE IN VACUUM**

D. C. Byers, P. M. Margosian, and G. E. Mealy  
Dec. 1972  
**LEWIS-11401**

High voltage insulator for electron bombardment ion thruster has electric field directed through dielectric material and electrons emitted by field emission are constrained in negative junction region. Surface flashover and unstable operation are eliminated, and maximum voltage is limited only by dielectric strength of material, aluminum oxide in this case.

**B72-10184**

**SPEED ENHANCEMENT OF COMPLEMENTARY MOS DEVICES**

M. Devlin (GE)  
1972

**ARC-10387**

Speed required for Sisyphus experiment on Pioneer probe was attained at supply voltage well within component limitations by combining supply voltage higher than nominal with low reactance interconnections. Speed was found to be far in excess of typical parameters suggested by manufacturers of MOS devices.

**B72-10185**

**LOW PHASE-SHIFT AMPLIFIER**

G. F. Lutes and R. C. Coffin  
Dec. 1972  
**NPO-11663**

Single-stage MOSFET amplifier is described which is identical to standard neutralized amplifier except that neutralization provided by broadband transformer is applied to AGC gate instead of signal gate. Neutralization of drain-to-control gate capacity minimizes the phase change induced by variation in AGC.

**B72-10186**

**PERFORMANCE OF SILICON SOLAR CELL ASSEMBLIES**

R. G. Ross, Jr., R. K. Yasui, W. Jaworski, L.-C. Wen, and E. L. Cleland  
Dec. 1972  
**NPO-11847**

Solar cell assembly current-voltage characteristics, thermal-optical properties, and power performance were determined. Solar cell cover glass thermal radiation, optical properties, confidence limits, and temperature intensity effects on maximum power were discussed.

## 01 ELECTRONICS/ELECTRICAL

### B72-10218 TEMPERATURE COMPENSATION OF LIGHT-EMITTING DIODES

G. J. Deboo and C. N. Burrous  
1972

ARC-10467

Circuit which includes a thermistor-resistor combination to compensate for temperature fluctuations by supplying input voltage to light-emitting diode, maintains constant light output. Similar circuits can be used for temperature-induced variations in photodiode applications.

### B72-10226 IMPROVED FEEDBACK SHIFT REGISTER

M. Perlman  
May 1972

NPO-10351

Design of feedback shift register with three tap feedback decoding scheme is described. Application for obtaining sequence synchronization patterns is examined. Operation of the circuitry is described and drawings of the systems are included.

### B72-10236 ELECTRONIC SWITCHING CIRCUIT USES COMPLEMENTARY NON-LINEAR COMPONENTS

O. S. Zucker  
Dec. 1972

AEC-10060

Inherent switching properties of saturable inductors and storage diodes are combined to perform large variety of electronic functions, such as pulse shaping, gating, and multiplexing. Passive elements replace active switching devices in generation of complex waveforms.

### B72-10245 BROADBAND RF-DISTRIBUTION AMPLIFIER

G. F. Lutes, Jr.  
Sep. 1972

NPO-11401

Radio frequency amplifier to distribute reference frequencies within communications systems and provide automatic gain control with low phase distortion is described. Use of photocell in electronic circuit to produce desired conditions is explained. Operation of entire amplifier circuit is analyzed.

### B72-10255 NARROWBAND, CRYSTAL-CONTROLLED BIOMEDICAL TELEMETRY SYSTEM

R. M. Westbrook and T. B. Fryer  
Dec. 1972

ARC-10708

Telemetry system utilizing miniature, single-channel, crystal-controlled transmitter is described suitable for biomedical applications. Receiver used in conjunction with transmitter is narrowband superheterodyne FM receiver with crystal control in both conversion stages.

### B72-10268 DRIVER CIRCUIT FOR INDUCTIVE LOADS

W. A. Cooke (Lockheed Missiles and Space Co.)  
1972

ARC-10073

Circuit, based on use of power transistors which do not display second breakdown under valve loading, drives inductive loads. Peak voltages, power dissipations, heat sink requirements, and thermal stability considerations can be obtained by theoretical analysis.

### B72-10271 MINIATURE INTERMITTENT CONTACT SWITCH

A. Sword (Stanford Univ.)  
1972

ARC-10450

Shock resistant switch is capable of being activated by any slight physical pressure on flexible conductor which causes it to come into contact with rigid conductor. Switch is used primarily

as a sensor on remote control (tele-operator) and prosthetic devices.

### B72-10275 AN INGESTIBLE TEMPERATURE-TRANSMITTER

J. M. Pope, T. B. Fryer, and H. Sandler  
Jul. 1972

ARC-10583

Pill-sized transmitter measures deep body temperature in studies of circadian rhythm and indicates general health. Ingestible device is a compromise between accuracy, circuit complexity, size and transmission range.

### B72-10304 CONTROL OF OSCILLATIONS IN A DISCHARGE CIRCUIT

D. Y. Cheng  
Sep. 1972

ARC-10556

Development of electric discharge circuit damping element which increases in resistance with current and time is described. Damping element is resistor made of tungsten wire which has large resistance-temperature coefficient. Specifications of tungsten resistor and incorporation into circuit are explained.

### B72-10308 A SIMPLE TACHOMETER CIRCUIT

J. Dimeff  
Sep. 1972

ARC-10603

Electric circuit to measure frequency of repetitive sinusoidal or rectangular wave is presented. Components of electric circuit and method of operation are explained. Application of circuit as tachometer for automobile is discussed.

### B72-10315 SIMPLE NON-DESTRUCTIVE TESTS FOR ELECTROEXPLOSIVE DEVICES

L. A. Rosenthal (Rutgers, Univ.) and V. J. Menichelli  
Jun. 1972

NPO-11563

Electrothermal behavior of bridgewire-explosive interface is defined by pulsing electroexplosive device with a safe level of current and examining the resistance variation of bridgewire. Bridgewire provides signal which describes average wire temperature and heat sinking to the explosive and enclosure.

### B72-10316 PROPERTIES OF IONIZATION BREAKDOWN OF AIR AT MICROWAVE FREQUENCIES AND OPTIMIZATION OF COMPONENT DIMENSIONS FOR MAXIMUM MICROWAVE POWER

L. L. Rainwater (Sperry Rand Corp.)  
Jul. 1972

M-FS-21924

Method provides optimization of dimensions in vented RF components for predictable performance at critical pressures, eliminates leakage from hermetically sealed types, and utilizes coaxial RF multicouplers.

### B72-10347 OVERLAP DIFFUSION FOR INCREASING PHOTOTRANSISTOR DYNAMIC RANGE

D. H. McCann (Westinghouse Elec. Corp.)  
Jul. 1972

M-FS-20407

Construction of improved phototransistors to provide increased base-collector capacitance is described. Silicon or germanium semiconductor wafers are used as examples. Operation of transistors and electrical properties are discussed and illustrations of the devices are included.

### B72-10363 IMPROVED UNIVERSAL ELECTRICAL CONNECTOR

B. W. Kennedy  
Jul. 1972

M-FS-14741



Universal electrical connector for use with various types of electric cable, inserts, and pin styles is described. Connector may be used over variety of environmental conditions. Details of construction are discussed. Illustrations of connector are included.

**B72-10369**

**A MANUALLY SET MAGNETIC WIRE COUNTER**

Innovator not given (Sandia Labs.) Dec. 1972

**AEC-10039**

Magnetic storage wire counter design principles are given. Magnetic storage wire was coupled with two phase propagational driver in manual set counter shift register. Time delay between magnetic counter domain insertion and corresponding output pulse provides counting functions.

**B72-10370**

**TWO-STAGE MAGNETOMETER MEASURES WEAK MAGNETIC FIELDS**

R. W. Buntenbach

Dec. 1972

**AEC-10068**

Sensitive magnetometer capable of measuring field strengths of 10 nanogauss is described. High permeability core is aligned parallel to magnetic field in first stage. In second stage, ferromagnetic toroid saturates rapidly. Adjustment of turns and area ratios of each stage provides wide range of sensitivities.

**B72-10376**

**A SONIC TRANSDUCER TO DETECT FLUID LEAKS**

I. Cimerman (Dynamatec Corp.) and J. Janus (Dynamatec Corp.)  
Jul. 1972 See also NASA-CR-124618

**KSC-10704**

Ultrasonic detector utilizes set of contact transducers and bandpass filters to detect and analyze sonic energy produced by flow or leakage. Detector covers wide frequency range and is operable at cryogenic temperatures and in vacuum.

**B72-10393**

**GUIDELINES FOR FABRICATION OF HYBRID MICROCIRCUITS**

W. D. McKee, Jr. (N. Am. Rockwell Corp.), J. E. Varga (N. Am. Rockwell Corp.), J. V. Brandewie (N. Am. Rockwell Corp.), and A. P. Poole, Jr. (N. Am. Rockwell Corp.)

Jul. 1972

**M-FS-21964**

Document is summary of approaches that may be taken in designing hybrid microcircuits similar to those for aerospace application.

**B72-10452**

**MINIATURE INTERMITTENT CONTACT SWITCH**

A. Sword (Stanford Univ.)

Aug. 1972

**ARC-10450**

Design of electric switch for providing intermittent contact is presented. Switch consists of flexible conductor surrounding, but separated from, fixed conductor. Flexing of outside conductor to contact fixed conductor completes circuit. Advantage is small size of switch compared to standard switches.

**B72-10453**

**CURRENT SWITCH HAS BUILT-IN TIME DELAY: A CONCEPT**

C. D. Jesch (N. Am. Rockwell Corp.)

Aug. 1972

**MSC-17324**

Switch concept provides simple means of achieving electro-mechanical time delay function. Unit consists of reed-type circuit breaker enclosed by copper tubing with electromagnetic coil wound around tubing and entire assembly mounted on insulating platform. Characteristics are affected only by geometry of system so device is expected to be very stable.

**B72-10455**

**NEW METER PROBES PROVIDE PROTECTION FROM HIGH**

**CURRENT POWER SOURCES AT POTENTIALS UP TO 600 VOLTS**

H. Long and J. Getsug

Aug. 1972

**LANGLEY-10804**

Meter probes incorporating integral fuse holder which contains limitation fuse of 600 V, 5A, with interruption rating of 50,000 KVA, provide required protection and minimize danger incurred by defective or improperly operated meter.

**B72-10462**

**INTERFEROMETER USING RF SWITCHING MATRIX**

R. N. VanVleet (GE)

Aug. 1972

**GSFC-11051**

Radio frequency switching technique for single receiver and data processing channel to be used for phase movement measurement is discussed. Components of interferometer radio frequency unit, X-band receiver, and interferometer data processing unit are illustrated. Elimination of major measurement error source is described.

**B72-10463**

**AMPLIFIER FOR SIGNAL FROM THIN FILM TRANSDUCER**

K. A. Jensen

Aug. 1972

**LEWIS-11494**

Electronic circuitry is devised to raise low level signal from platinum film type transducer to sufficient amplitude to trigger oscilloscope or time interval counter. Circuit can be used wherever it is necessary to raise level of low amplitude, low impedance positive polarity pulse source to a 5 or 6 volt level.

**B72-10474**

**SPECIFICATION GUIDELINES FOR HYBRID MICROCIRCUITS**

S. V. Caruso

Aug. 1972

**M-FS-22090**

Guidelines establishing manufacturing and control procedures for hybrid microcircuits used in aerospace programs may have possible commercial and industrial applications. Guidelines encompass parts, materials, and process controls, as well as assembly, packaging methods, screening, and inspection procedures for procurement of custom packaged, high reliability microcircuits.

**B72-10477**

**LOW FREQUENCY SINUSOIDAL PRESSURE GENERATOR**

J. S. Curreri

Aug. 1972 See also NASA-TN-D-6166

**LEWIS-11465**

Low frequency pressure generator is built to provide sinusoidal driving function in frequency range from 0.05 to 50 Hz for frequency response testing of pressure transducers used in liquid-filled systems. Generator consists of piston-in-cylinder, scotch-yoke mechanism machined into piston, and adjustable eccentric.

**B72-10479**

**IMPROVED OPERATION OF RECHARGEABLE OXYGEN ELECTRODES**

P. A. Malachuk (Tyco Corporate Technol. Center) and G. L. Holleck (Tyco Corporate Technol. Center)

Aug. 1972 See also NASA-CR-72999

**LEWIS-11619**

Procedure for enhancing operating life and performance of oxygen electrodes in rechargeable metal-oxygen batteries and hydrogen-oxygen fuel cells is discussed. Accumulation of refractory anodic oxide layer and inhibiting effects on oxygen reduction are described. Improvements in service life of batteries by following procedure are explained.

**B72-10480**

**HIGH INTENSITY SOLAR CELL RADIOMETER**

H. W. Brandhorst and E. W. Spisz

## 01 ELECTRONICS/ELECTRICAL

Aug. 1972

### LEWIS-11549

Device can be employed under high intensity illumination conditions such as would occur in a close-solar-approach space mission or in monitoring high intensity lamps. Radiometer consists of silicon solar cells with thin semi-transparent coatings of aluminum deposited on the front surfaces to permit transmission of small percentage of light and reflect the remainder.

### B72-10492

#### IMPROVED ELECTRICAL SPOT TERMINALS

C. D. Baker

Aug. 1972

### NPO-10034

Improved electrical spot terminal has been developed which can be rigidly attached to terminal mounting board. Mounting board is bonded to epoxy board which in turn is bonded to printed circuit board with high temperature adhesive. Conductive lead is coupled between electrical terminal and circuit trace on circuit board. Shape is usually clover-leaf.

### B72-10505

#### NOVEL DIELECTRIC REDUCES CORONA BREAKDOWN IN ac CAPACITORS

J. L. Loehner (McDonnell-Douglas Corp.)

Aug. 1972

### M-FS-21486

Dielectric system was developed which consists of two layers of 25-gage paper separated by one layer of 50-gage polypropylene to reduce corona breakdown in ac capacitors. System can be used in any alternating current application where constant voltage does not exceed 400 V rms. With a little research it could probably be increased to 700 to 800 V rms.

### B72-10506

#### WATERTIGHT LOW-COST ELECTRICAL CONNECTOR

J. E. Dudenhoefer and M. N. Miraldi

Dec. 1972

### LEWIS-11552

Fabrication is described of waterproof electrical connector assembly for use with Teflon jacketed cables and constructed so that assembly will remain sealed under extreme environmental conditions. Conditions are specified as: pressure from vacuum to atmospheric; temperature from 280 K to 450 K; exposure to saturated steam; and steam suddenly introduced into vacuum.

### B72-10518

#### A VOLTAGE-TUNABLE THREE-TERMINAL GUNN DEVICE

R. J. Schwartz (Purdue Univ.) and J. J. Nahas (Purdue Univ.)

Aug. 1972

### HQ-10783

Newly developed Gunn oscillator is three-terminal device which consists of piece of gallium arsenide with source, drain, and gate contacts. Voltage tunable three-terminal device does not require bulky resonant cavity and allows oscillation frequency to be rapidly tuned with simple circuitry.

### B72-10523

#### MECHANICALLY AND THERMALLY STABLE MASER CAVITY RESONATOR

R. F. C. Vessot (Smithsonian Astrophys. Obs.), T. E. Hoffman (Smithsonian Astrophys. Obs.), and M. W. Levine (Smithsonian Astrophys. Obs.)

Aug. 1972

### HQ-10790

New type cavity resonator is designed for hydrogen maser. Resonator consists of three pieces of glass-ceramic material having extremely low thermal coefficient of expansion and provides very stable mechanical tuning.

### B72-10527

#### Al/C12 MOLTEN SALT BATTERY

J. Giner (Tyco Labs., Inc.)

Aug. 1972

### HQ-10696

Molten salt battery has been developed with theoretical energy

density of 5.2 j/kg (650 W-h/lb). Battery, which operates at 150 C, can be used in primary mode or as rechargeable battery. Battery has aluminum anode and chlorine cathode. Electrolyte is mixture of  $AlCl_3$ , NaCl, and some alkali metal halide such as KCl.

### B72-10530

#### CATHODE FOR USE WITH LOW DENSITY GASES

W. H. Bennett (N. C. State Univ.)

Aug. 1972

### HQ-10687

Method for preventing deterioration of mixed oxide cathodes in low density gas tubes caused by ion bombardment is discussed. Construction of cathode is described and illustration is furnished. Electron emission through space charge to neutralize ion-filled regions is basic process.

### B72-10555

#### ELECTRONIC INTEGRATOR FOR GYRO RATE OUTPUT VOLTAGES

R. A. Crawford, P. J. Hand, and H. H. Horiuchi

Sep. 1972

### NPO-11499

Circuit which integrates spacecraft gyro output voltages to provide analog position signals has been developed. Accurate integration is provided by all solid state system which uses no choppers and takes advantage of commercially available flight qualified components.

### B72-10561

#### PHOTOMULTIPLIER BLANKING CIRCUIT

J. O. McClenahan

Sep. 1972

### ARC-10593

Circuit for protecting photomultiplier equipment from current surges which occur when exposed to brilliant illumination is discussed. Components of circuit and details of operation are provided. Circuit diagram to show action of blanking pulse on zener diode is included.

### B72-10578

#### AN ABSENTEE MONITORING DEVICE

A. L. Meadows (Boeing Co.) and D. C. Birch (Boeing Co.)

Sep. 1972

### KSC-10668

Development of audio alarm system to provide remote monitoring of warning devices is discussed. Device uses photodiode connected to self-powered audio alarm unit. Photograph of equipment is included.

### B72-10643

#### REDUNDANCY APPROACHES IN BUBBLE DOMAIN MEMORIES

G. S. Almasi (IBM) and S. E. Schuster (IBM)

Oct. 1972

### M-FS-21915

Fabrication of integrated circuit chips to compensate for faulty memory elements is discussed. Procedure for testing chips to determine extent of redundancy and faults is described. Mathematical model to define operation is presented. Schematic circuit diagram of test equipment is provided.

### B72-10646

#### DUAL FIELD ALIGNMENT DISPLAY AND CONTROL FOR ELECTRON MICROPATTERN GENERATOR

P. R. Malmberg (Westinghouse) and T. W. O'Keeffe (Westinghouse)

Oct. 1972

### M-FS-22118

Application of electron beam lithography to replace photolithography process in fabrication of integrated circuits is discussed. Procedure for using electron beam lithography equipment is described. Diagram of electron micropattern generator is provided.

### B72-10673

#### HIGH TEMPERATURE GALLIUM PHOSPHIDE RECTIFIERS

M. G. Craford (Monsanto Co.) and D. L. Keune (Monsanto Co.)

Dec. 1972 see also NASA-CR-2098

#### LEWIS-11804

Development of high reverse breakdown voltage and low forward voltage drop stability in high power Schottky GaP rectifier for high temperature application is reported.

#### B72-10691

#### DIODE-QUAD BRIDGE FOR REACTIVE TRANSDUCERS AND FM DISCRIMINATORS

D. R. Harrison and J. Dimeff

Oct. 1972

#### ARC-10364

Diode-quad bridge circuit was developed for use with pressure-sensitive capacitive transducers, liquid-level measuring devices, proximity deflection sensors, and inductive displacement sensors. It may also be used as FM discriminator and as universal impedance bridge.

#### B72-10696

#### DEVELOPMENT OF CHIP PASSIVATED MONOLITHIC COMPLEMENTARY MISFET CIRCUITS WITH BEAM LEADS

L. J. Ragonese (GE), M. J. Kim (GE), B. L. Corrie (GE), J. W. Brouillette (GE), and R. E. Warr (GE)

Dec. 1972 See also NASA-CR-123742

#### M-FS-22264

Fabrication method is described for alumina passivated silicon MISFET arrays. Technique involves total passivation beam-lead approach and provides completely sealed chip with double level interconnect capability. Refractory metal alloy is used to form interconnect system and obtain metal contacts that withstand temperatures of 873 K for short periods of time.

#### B72-10697

#### OPTIMAL READ/WRITE MEMORY SYSTEM COMPONENTS

A. Kozma (Radiation, Inc.), A. Vander Lugt (Radiation Inc.), and D. Klinger (Radiation Inc.)

Dec. 1972

#### M-FS-22044

Two holographic data storage and display systems, voltage gradient ionization system, and linear strain manipulation system are discussed in terms of creating fast, high bit density, storage device. Components described include: novel mounting fixture for photoplastic arrays; corona discharge device; and block data composer.

#### B72-10705

#### WAVEGUIDE SWITCH PROTECTOR

R. B. Kolbly

Oct. 1972

#### NPO-11592

Device for detecting excessive operation of electric motors used to drive waveguide switches is described. Purpose of device is to prevent burnout of electric motor in event of waveguide stoppage at some point other than extreme limits of travel. Operation of equipment, components used to sense motor performance, and schematic diagram are included.

#### B72-10719

#### IRRADIATION OF MOS-FET DEVICES TO PROVIDE DESIRED LOGIC FUNCTIONS

V. Danchenko and D. H. Schaefer

Dec. 1972

#### GSFC-11061

Gamma, X-ray, electron, or other radiation is used to shift threshold potentials of MOS devices on logic circuits. Before irradiation MOS gates to be shifted are biased positive and other gates are grounded to substrate. Threshold lasts 10 years. Thermal annealing brings circuit back to original configuration.

#### B72-10729

#### FREQUENCY-TO-AMPLITUDE CONVERTER: A CONCEPT

C. H. Stewart

Dec. 1972

#### MSC-12395

Circuit allows direct frequency to amplitude conversion without special counters and discriminators and provides for individual or simultaneous emphasis of high or low frequencies. Circuit is simple, small, light weight, and versatile in its frequency range and region of conversion.

#### B72-10731

#### INSULATED-GATE FIELD-EFFECT TRANSISTOR STRAIN

#### SENSOR

C. Gross

Dec. 1972

#### LANGLEY-11012

Strain sensors that can be switched on and off were fabricated from p-channel IGFET on thin filament n-type silicon crystals with silicon dioxide layer sputtered over transistor for passivation. Applications include integration with microelectronic circuits for multiplexing.

#### B72-10735

#### A PANEL SPACE FOR RFI SHIELDING GASKET: A CONCEPT

W. T. Goins (N. Am. Rockwell Corp.)

Dec. 1972

#### MSC-17827

Method for spacing and shielding console chassis from panel is described. Small Teflon buttons are force-fitted into standard holes in console.

#### B72-10737

#### WIDEBAND WATTMETER FOR INSTANT MEASUREMENT OF REAL POWER

L. G. Landes (Barnes and Reinecke, Inc.) and Y. Y. Liu (Barnes and Reinecke, Inc.)

Dec. 1972 See also NASA-CR-72752

#### LEWIS-11698

Portable, solid state wattmeter with wideband (dc to 1 MHz) linear multiplier which provides true four quadrant operation permitting instantaneous indication of real power as oscilloscope display is described.

#### B72-10741

#### DESIGN OF MICROSTRIP COMPONENTS BY COMPUTER

T. C. Cisco (CAED Corp.)

Dec. 1972

#### LANGLEY-11210

Development of computer programs for component analysis and design aids used in production of microstrip components is discussed. System includes designs for couplers, filters, circulators, transformers, power splitters, diode switches, and attenuators.

#### B72-10755

#### GATE PROTECTIVE DEVICE FOR SOS ARRAY

J. E. Meyer, Jr. (David Sarnoff Res. Center) and J. H. Scott (David Sarnoff Res. Center)

Dec. 1972

#### HQ-10745

Protective gate device consisting of alternating heavily doped n(+) and p(+) diffusions eliminates breakdown voltages in silicon oxide on sapphire arrays caused by electrostatic discharge from person or equipment. Diffusions are easily produced during normal double epitaxial processing. Devices with nine layers had 27-volt breakdown.

## 02 ELECTRONIC/ELECTRICAL SYSTEMS

#### B72-10018

#### A HYBRID ELECTROMECHANICAL SOLID STATE SWITCH FOR ac POWER CONTROL

Innovator not given (Teledyne Kinet.) 1972 See also B67-10165

#### MSC-14005

Bidirectional thyristor coupled to a series of actuator driven electromechanical contacts generates hybrid electromechanical solid state switch for ac power control. Device is useful in power control applications where zero crossover switching is required.

#### B72-10030

#### THIRD ORDER DIGITAL-TO-ANALOG CONVERTER

W. P. Dotson

1972

#### MSC-12458

System, consisting of sample and hold digital-to-analog

## 02 ELECTRONIC/ELECTRICAL SYSTEMS

converter, clock circuit, sample delay circuit, initial condition circuit and interpolator circuit, improves accuracy of reconstructed analog signal without increasing sample rates.

**B72-10050**

### **ELECTRODES FOR SEALED SECONDARY BATTERIES**

D. B. Boies (IIT Res. Inst.) and F. T. Child (IIT Res. Inst.)

1972

**ARC-10238**

Self-supporting membrane electrode structures, in which active ingredients and graphite are incorporated in a polymeric matrix, improve performance of electrodes in miniature, sealed, alkaline storage batteries.

**B72-10051**

### **IMPROVED DEVICE MEASURES PERFORMANCE OF BATTERIES UNDER LOAD**

J. D. Powell (TRW, Inc.)

1972

**ARC-10252**

Kordesck-Marko interrupter bridge circuit includes capability of varying frequency of interruption in steps from 60 Hz to 2000 Hz range extension, and addition of operating modes to allow instrument to serve as steady dc constant-current source or load, or source of interrupted constant current.

**B72-10052**

### **ADAPTIVE POSITION CONTROL LOOP**

W. L. Keltz (GE)

1972 See also NASA-CR-73304

**ARC-10255**

Design of attitude control system for a sounding rocket is established by using a control loop which incorporates a lead network to convert position output into a feedback signal that is approximately proportional to position, plus a constant times rate.

**B72-10074**

### **OXYGEN PRESSURE CONTROL FOR ELECTROLYSIS CELLS**

J. D. Powell (TRW, Inc.)

1972

**ARC-10250**

Duty cycle of switched, constant current circuit controlled by pressure sensor provides oxygen at a constant pressure from a cell which electrolyzes water, eliminating possibility of cell damage by excessive oxygen demand.

**B72-10076**

### **QUICK RELEASE ACOUSTIC SENSOR HOLDING FIXTURE**

W. McMahon (N. Am. Rockwell Corp.) and E. S. Scherba (N. Am. Rockwell Corp.)

1972

**MSC-17457**

Quick-release spring holder secures acoustic sensor to test material surface eliminating adhesive bonding to test material and achieving acoustic emission evaluation from tensile tests. Reusability of sensors reduces test cost.

**B72-10086**

### **INTRODUCTION OF LITHIUM INTO THE FRONT SURFACE OF SOLAR CELLS**

P. A. Iles (Globe-Union, Inc.)

1972

**NPO-11404**

Time-temperature cycle provides sufficient lithium in the active regions of solar cells. Gradient of lithium is less subject to alteration by P-N junction field.

**B72-10088**

### **TECHNIQUE MINIMIZES THE EFFECTS OF DROPOUTS ON TELEMETRY RECORDS**

T. O. Anderson and W. J. Hurd

1972

**NPO-11421**

Recorder deficiencies are minimized by using two-channel system to prepare two tapes, each having noise, wow and flutter,

and dropout characteristics of channel on which it was made. Processing tapes by computer and combining signals from two channels produce single tape free of dropouts caused by recording process.

**B72-10089**

### **ACCURATE MEASUREMENT OF TELEMETRY PERFORMANCE**

R. W. Burt, N. C. Ham, C. T. Sterlzried, and M. S. Reid

1972

**NPO-11457**

Performance of high rate telemetry stations used in the Deep Space Network is verified. Measurement techniques are discussed.

**B72-10091**

### **CONTROL OF ACCELERATION IN SINE/RANDOM VIBRATION TESTS**

R. C. Woodbury

1972

**NPO-11482**

Sampling output levels of accelerometers using largest output or any combination of outputs provide control of shaker for spacecraft vibration qualification tests.

**B72-10094**

### **INERTIAL REFERENCE UNIT**

R. A. Crawford

1972

**NPO-11518**

Unit provides rate damping, linear velocity changes and angular position information to attitude control system during turns and motor burns.

**B72-10098**

### **SOLDERING IRON TEMPERATURE INDICATOR**

C. D. Baker and G. A. Wiker

1972

**NPO-11545**

Thermocouple implanted in metal mass simulates heat transfer characteristics of connection which is to be soldered. Light signals indicate whether temperature is right, too high, or too low.

**B72-10099**

### **ARC PROTECTION SYSTEM FOR HIGH-POWER RF AMPLIFIERS**

R. C. Chernoff

1972

**NPO-11560**

Protective system prevents damage or destruction of high-power RF amplifiers by arcs which may occur in output transmission line. Advantages of system are listed.

**B72-10101**

### **STANDARD ENVIRONMENTAL TESTING PRACTICES**

R. Daniel, E. Gregory, J. Stoker, F. VanBiene, and R. C. Woodbury

1972

**NPO-11567**

Manual on procedural requirements for performing certain environmental tests on space flight equipment provides information for test equipment designers, quality control and production engineers. Contents of manual are summarized.

**B72-10108**

### **LOW NOISE ELECTROMAGNETIC FLOWMETER**

V. J. Cushing (Eng.-Phys. Co.)

May 1972

**M-FS-21291**

Parasitic hum is removed by using an isophase magnetic field created within flowmeter and an enclosure which prevents leakage of flux field. Method prevents contamination of flow conduit and eliminates zero point drift.

**B72-10109**

### **TECHNIQUES FOR IMPROVING RELIABILITY OF COMPUTERS**

W. C. Cater (IBM), C. E. McCarthy (IBM), D. C. Jessep (IBM),

A. B. Wadia (IBM), F. G. Milligan (IBM), and W. G. Bouricius (IBM)  
May 1972  
**M-FS-21326**

Modular design techniques improve methods of error detection, diagnosis, and recovery. Theoretical computer (MARCS (Modular Architecture for Reliable Computer Systems)) study deals with postulated and modeled technology indigenous to 1975-1980. Study developments are discussed.

**B72-10119**  
**HIGH VOLTAGE PROTECTION NETWORK**  
J. M. Cambra  
1972

**ARC-10197**  
Circuit protects technical personnel and test equipment from hazardous currents conducted through safety barriers and into data acquisition equipment. Network isolates energy source, restricts arcing to remote area, and dissipates harmlessly residual energy transient.

**B72-10131**  
**HEART SIMULATOR**  
E. Palmer  
May 1972  
**M-FS-21609**

Unijunction oscillator controlled by potentiometer to generate a spike that may be converted by transformer action to the simulated heart beat is used as a calibrator for heart monitoring equipment.

**B72-10139**  
**AIRCRAFT COMMUNICATION VIA TELEFACSIMILE SYSTEM**  
R. L. Brown, Sr.  
1972  
**M-FS-20839**

Based on reading rate of between 500-1000 words/minute, transmitting typewritten matter only, system uses lowest possible bandwidth to avoid overcrowding, while furnishing data as fast as it can be absorbed by pilot. Bandwidth requirements are less than 150 kHz, a considerable saving over conventional television.

**B72-10141**  
**ERRORS IN HYBRID COMPUTERS**  
C. O. Alford (Ga. Inst. of Tech.) and J. L. Hammond (Ga. Inst. of Tech.)  
1972  
**M-FS-21289**

Method is described for reduction of error components in numerical integration, sampling with zero hold order, and execution time delay.

**B72-10164**  
**INTERCONNECTIONS FOR FLUIDIC CIRCUITS**  
C. Mangion (TRW Systems Group)  
1972  
**ARC-10481**

Circuit elements are grouped on functional basis in rectangular two-dimensional planar arrays or modules. Another interconnection method brings all connections out to module edge. For smaller fluidic circuits, manifold and interconnections are fabricated as single blocks. Advantages of methods are given.

**B72-10167**  
**ILLUMINATION CONTROL SYSTEM**  
C. Beckman (Gen. Tech. Serv., Inc.)  
1972  
**ARC-10527**

Experiment, testing effects of constant light intensity on Arabidopsis growth, utilizes wide-spectrum fluorescent lamps monitored by photocell which controls the power supplied to lamp.

**B72-10177**  
**FLEXIBLE, LOW-COST SILICON SOLAR CELL ARRAYS**

A. F. Forestieri, J. D. Broder, and D. T. Bernatowicz  
May 1972 See also NASA-TM-X-52875  
**LEWIS-11069**

Silicon solar cell arrays are pressure-bonded to flexible backing and protected by fluorinated ethylene propylene cover in one mechanized operation. Arrays packaged by this method are flexible, lightweight, insulated, breakage resistant and less expensive.

**B72-10191**  
**OVERLAY BOARD FOR CONTROL CONSOLES**  
C. T. Jackson  
May 1972  
**ARC-10007**

Board that fits over the control panel decreases errors and time loss. Device has cutouts for controls and indicators, bears all appropriate labeling information, can be removed with the changing computer assignments, and guards against accidental changes in control settings.

**B72-10254**  
**SOLID STATE TELEVISION CAMERA HAS NO IMAGING TUBE**  
C. T. Huggins  
Jun. 1972  
**M-FS-21553**

Camera with characteristics of vidicon camera and greater resolution than home TV receiver uses mosaic of phototransistors. Because of low power and small size, camera has many applications. Mosaics can be used as cathode ray tubes and analog-to-digital converters.

**B72-10272**  
**LIGHTNING FLASH DETECTION SYSTEM**  
W. J. Borucki and D. Billings  
1972  
**ARC-10562**

Array of photodetectors and associated circuitry continuously monitors entire horizon to measure distance and direction of lightning flashes.

**B72-10285**  
**VIDICON STORAGE TUBE ELECTRICAL INPUT/OUTPUT**  
P. Lipoma (Lockheed Electron. Co.)  
Jun. 1972  
**MSC-14053**

Electrical data storage tube is assembled from standard vidicon tube using conventional amplification and control circuits. Vidicon storage tube is simple, inexpensive and has an erase and preparation time of less than 5 microseconds.

**B72-10286**  
**DESIGN CURVE FOR LIQUID HELIUM STORAGE VESSELS**  
J. A. DiCarlo  
Jun. 1972  
**LEWIS-11498**

Development of equipment for storage of liquid helium is discussed. Derivation of design curve and working equations for estimating effects of either perfect or imperfect heat transfer in storage device are described. Mathematical models of heat transfer conditions are provided.

**B72-10295**  
**THE DESIGN OF AN AUTOMATED VERIFICATION OF REDUNDANT SYSTEMS**  
F. A. Ford (Radiation, Inc.), T. W. Hasslinger (Radiation, Inc.), and F. J. Moreno (Radiation, Inc.)  
Jun. 1972 See also NASA-CR-125311  
**KSC-10702**

Handbook describes design processes, presents design considerations and techniques, gives tutorial material on implementation and methodology, shows design aids, illustrates use of design aids and application samples, and identifies general practices to be adhered to or avoided.

**B72-10296**  
**NONDESTRUCTIVE TESTING OF MICROTAB WELDS**

## 02 ELECTRONIC/ELECTRICAL SYSTEMS

L. Feinstein and R. J. Hruby

Sep. 1972

ARC-10176

Introduction of sinusoidal signal across welded structure to determine reliability of integrated circuit connections is discussed. In-phase frequencies and quadrature frequency functions are used to evaluate weld reliability. Schematic diagram of test equipment and components is provided.

B72-10357

### ZONE RADIOMETER MEASUREMENTS ON A MODEL ROCKET EXHAUST PLUME

Innovator not given (Cornell Aeron. Lab., Inc.) Jul. 1972

M-FS-21693

Radiometer for analytical prediction of rocket plume-to-booster thermal radiation and convective heating is described. Applications for engine combustion analysis, incineration, and pollution control by high temperature processing are discussed. Illustrations of equipment are included.

B72-10361

### A STUDY OF THE POWER SPECTRAL DENSITY OF AN FM SIGNAL

H. L. Deffebach (Auburn Univ.)

Jul. 1972

M-FS-21070

Mathematical expressions describe an FM signal modulated by a composite video wave. Three general spectrum equations for FM signals are obtained by using three types of video information.

B72-10372

### AUTOMATIC LIGHTNING LOCATION SYSTEM

T. Holdsworth and D. N. March

Dec. 1972

AEC-10077

Hyperbolic triangulation method was used for locating lightning storm path and position from VHF lightning charge emissions. Possible applications in electric power companies, forest fire lookout centers, airports, and pipeline companies are indicated.

B72-10383

### SURVEY OF AIRCRAFT ELECTRICAL POWER SYSTEMS

C. H. Lee (AiRes. Mfg. Co.) and J. J. Brandner (AiRes. Mfg. Co.)

Jul. 1972 See also NASA-CR-110693

LEWIS-11678

Areas investigated include: (1) load analysis; (2) power distribution, conversion techniques and generation; (3) design criteria and performance capabilities of hydraulic and pneumatic systems; (4) system control and protection methods; (5) component and heat transfer systems cooling; and (6) electrical system reliability.

B72-10390

### A CLOSED LOOP CRYOGENIC ENVIRONMENT PRESSURE REGULATING SYSTEM

J. C. Huguley (Brown and Root/Northrop) and L. A. Goudie (Brown and Root/Northrop)

Jul. 1972

MSC-13880

Nonlinear closed loop control system to regulate the pressure in a cryogenic environment is described. System employs four position contactor with two control bands to react to the signals. Diagrams of element transfer function and required equipment are included.

B72-10392

### TWO-AXIS LEVELING DETECTOR SYSTEM

L. Weiner (Bendix Corp.)

Jul. 1972

M-FS-21344

Electro-mechanical device for measuring tilt angles in order to establish level base without optical reference is described. Angular displacement is detected by movement of bubble in conducting fluid containing electrode network. Electrical signal

causes compensation for small movements in horizontal and vertical planes.

B72-10409

### A SIMPLE DEAD-RECKONING NAVIGATIONAL SYSTEM

B. F. Walls, W. C. Mastin, and P. H. Broussard, Jr.

Jul. 1972

M-FS-21165

Simple navigation system is designed for vehicles operating in remote locations where it is not feasible to transport extensive equipment. System consists of four main components: directional gyrocompass to establish inertial direction; odometer to measure distance; signal processor to combine measured distance and direction; and sun compass to determine initial direction.

B72-10411

### LASER BEAM DEFLECTION CONTROL: A CONCEPT

C. L. Garvie (Lockheed Electron. Co.)

Jul. 1972

MSC-13814

Improved control of laser beam deflection angles may result from new conceptual device. Reflectively coated magnetized particles are suspended in liquid-filled cell surrounded by two pairs of crossed electromagnetic coils and are selectively aligned by controlling magnetic fields. Ultrasonic energy source keeps particles suspended.

B72-10417

### ROLL FUNCTION IN A FLIGHT SIMULATOR

A. E. Brain (Stanford Res. Inst.)

Aug. 1972

ARC-10557

Method introduces roll into the flying-spot scanner by modifying the scanning waveforms.

B72-10442

### VERY HIGH SPEED DIRECT-READOUT, CONTROL AND RECORDING SYSTEM

J. W. Turner

Jul. 1972

M-FS-20658

Characteristics of electronic system for high speed readout, control, and recording of data are discussed. Operation of system is described to show rate of data processing and accuracy obtainable. Primary advantage of system is providing direct recording of parameter value several times per second.

B72-10448

### A BRUSHLESS dc SPIN MOTOR FOR MOMENTUM EXCHANGE ALTITUDE CONTROL

D. Stern (GE) and J. W. Rosenlieb (GE)

Jul. 1972

M-FS-14952

Brushless dc spin motor is designed to use Hall effect probes as means of revolving rotor position and controlling motor winding currents. This results in 3 to 1 reduction in watt-hours required for wheel acceleration, a 2 to 1 reduction in power to run wheel, and a 10 to 1 reduction in the electronics size and weight.

B72-10467

### AIRLOCK CAUTION AND WARNING SYSTEM

W. J. Mayfield (McDonnell-Douglas Corp.), L. Z. Cork (McDonnell-Douglas Corp.), R. G. Malchow (McDonnell-Douglas Corp.), and G. L. Hornback (McDonnell-Douglas Corp.)

Aug. 1972

M-FS-21576

Caution and warning system, used to monitor performance and warn of hazards or out-of-limit conditions on space vehicles, may have application to aircraft and railway transit systems. System consists of caution and warning subsystem and emergency subsystem.

B72-10468

### NEUTRON RADIOGRAPHIC VIEWING SYSTEM

W. Leysath (Zenith Radio Corp.) and R. L. Brown

Aug. 1972  
M-FS-22024

Neutron radiographic viewing system consisting of camera head and control processor is developed for use in nondestructive testing applications. Camera head consists of neutron-sensitive image intensifier system, power supply, and SEC vidicon camera head. Both systems, with their optics, are housed on test mount.

**B72-10471**  
**UNSUPPORTED THIN FILM BEAM SPLITTER**

R. C. Bastien (Perkin Elmer Corp.) and R. J. Scheuerman (Perkin Elmer Corp.)

Aug. 1972  
GSFC-10525

Multilayer beam splitter system yielding nearly equal broad-band infrared reflectance and transmittance in the 5 to 50 micron spectral region has been developed which will significantly reduce size and cost of light path compensating devices in infrared spectral instruments.

**B72-10481**  
**ENHANCED LAMB DIP FOR ABSOLUTE LASER FREQUENCY STABILIZATION**

A. E. Siegman (Stanford Univ.), R. L. Byer (Stanford Univ.), and S. C. Wang (Stanford Univ.)

Aug. 1972  
HQ-10695

Enhanced Lamb dip width is 5 MHz and total depth is 10 percent of peak power. Present configuration is useful as frequency standard in near infrared. Technique extends to other lasers, for which low pressure narrow linewidth gain tubes can be constructed.

**B72-10501**  
**INDEXING FILM WITH A FLUIDIC SENSOR**

A. N. Maciel, Jr. (Singer/Gen. Precision, Inc.)

Aug. 1972  
MSC-14117

Fluidic sensor is used to measure passage of film without mechanical contact with counting device. Same sensor system may be used for different sizes of film. System has two fluidic sensors and operates on principle of electrically recording interruptions in air stream.

**B72-10507**  
**PULSE-WIDTH-MODULATED DEVICE FOR PRECISION TEMPERATURE CONTROL**

R. C. Heyser  
Dec. 1972

NPO-11407

Temperature controller is described which reduces difference between temperature oscillations about control point. Standard temperature-sensitive resistor element is utilized which is highly stable and reproducible. Temperature sensing circuitry is conventional dc bridge with power supplied by battery or highly regulated supply source.

**B72-10508**  
**RADIO DIRECTION FINDER**

L. M. Hershey  
Dec. 1972

NPO-11573

Three-antenna interferometric system is described for homing on very high frequency transmitters. Antenna signals are sequentially sampled with single receiver and receiver output pulses are held for comparison of signals from outermost antennas with those of center antenna. System can be installed as redundant navigation system in case of failure of VOR receivers.

**B72-10510**  
**UNIVERSAL dc SIGNAL CONDITIONER**

P. A. Bradanini (N. Am. Rockwell Corp.)  
Aug. 1972

MSC-17526

Signal conditioner was designed which can condition dc signals over range of + or - volts. It is lighter, has lower initial

and maintenance costs, and higher reliability than conventional discrete circuit designs. System incorporates linear integrated circuits in conjunction with hybrid, thin film circuit technology to achieve high degree of circuit miniaturization.

**B72-10535**  
**MAGNETIC CIRCUITRY MUTUAL COUPLING PROBE**

P. L. Anthony (N. Am. Rockwell Corp.)

Sep. 1972  
M-FS-21664

Development of magnetic probe for nondestructive testing of multilayer printed circuit boards to determine existence of opens or shorts is reported. Components of probe are described and procedures for operation are discussed. Two illustrations are provided to show magnetic circuits and principles of operation.

**B72-10541**  
**POTENTIOMETER, CONSTANT TENSION AND LUBRICATION DEVICE**

H. J. Smith (Boeing Co.)

Dec. 1972  
KSC-10723

Wiper assembly is described for feedback potentiometers which provides self cleaning, self lubrication, and tension within controlled limits. Each end of the assembly contains loose fitting leather pad thoroughly soaked in wiper lubricating fluid. Cleaning and lubrication of potentiometer resulting from use of lubrication soaked leather accomplishes noise free operation.

**B72-10545**  
**A COMPACT BATTERY POWERED DIGITAL THERMOMETER**

G. Zivley (SCI Electron., Inc.)

Sep. 1972  
MSC-14084

Development of thermometer to provide quick and accurate temperature readings using thermal resistance probe as temperature-to-resistance transducer is discussed. Details of construction and operations are described. Illustration of circuit and components is provided.

**B72-10548**  
**THE THIN FILM MICROWAVE IRIS**

R. L. Ramey (Va. Univ.), H. S. Landes (Va. Univ.), and E. A. Manus (Va. Univ.)

Sep. 1972 See also NASA-CR-1364  
LANGLEY-10511

Development of waveguide iris for microwave coupling applications using thin film techniques is discussed. Production process and installation of iris are described. Iris improves power transmission properties of waveguide window.

**B72-10564**  
**NEW PULSING TECHNIQUE MAY IMPROVE RADAR RANGING SYSTEMS**

M. V. Gowdey  
Sep. 1972

ARC-10600

Mode of operation for radar ranging system based on ringing frequencies is described. Methods for measuring range and range rate are discussed. Mathematical model is included to describe ringing frequency. Application to acoustic sounding devices is proposed.

**B72-10573**  
**AN IMPROVED LEARNING DECODER**

G. D. Doland (Lockheed Electron. Co., Inc.)

Oct. 1972  
MSC-14070

Learning decoder was developed which operates at system data rate without limiting data rate. Decoder is much simpler than those in existence, operates near Shannon's channel capacity, and automatically recovers operation after loss of signal.

**B72-10591**  
**A SIMPLIFIED, COMPACT STATIC SHIFT REGISTER**



## 02 ELECTRONIC/ELECTRICAL SYSTEMS

R. L. Pryor (RCA) and A. M. Smith (RCA)  
Sep. 1972  
**HQ-10723**

Shift register was developed which uses only one D type flip-flop and improves packaging density by approximately 25% over the usual arrangement. Circuit is compromise between full master-slave arrangement and dynamic shift register, with limitation only of length of time that clock can be held high during new data entry.

**B72-10609**  
**OSCILLATING HOT-WIRE ANEMOMETER**  
J. M. Conley  
Dec. 1972  
**NPO-11634**

Performance analysis was made of oscillating hot-wire anemometer electrical output in gas stream. Advantages include no calibration and measurement of fluid direction as well as fluid speed.

**B72-10639**  
**A RANGE EXPANDING SIGNAL CONDITIONER**  
W. A. Russell (McDonnell-Douglas Corp.), R. L. Grant (McDonnell-Douglas Corp.), and M. L. Scheer (McDonnell-Douglas Corp.)  
Oct. 1972  
**M-FS-21720**

Telemetry system modifications to improve signal resolution are described. Process uses zero suppression technique which consists of subtracting known voltage from input and amplifying remainder. Schematic diagram of circuit is provided and details of operation are presented.

**B72-10647**  
**A VISUAL-DISPLAY AND STORAGE DEVICE**  
D. R. Bosomworth (RCA) and W. H. Moles (RCA)  
Oct. 1972  
**GSFC-10901**

Memory and display device uses cathodochromic material to store visual information and fast phosphor to recall information for display and electronic processing. Cathodochromic material changes color when bombarded with electrons, and is restored to its original color when exposed to light of appropriate wavelength.

**B72-10664**  
**FAST RESPONSE DENSITOMETER FOR MEASURING LIQUID DENSITY**  
Innovator not given (Ind. Nucleonics Corp.) Oct. 1972  
**M-FS-14478**

Densitometer was developed which produces linear voltage proportional to changes in density of flowing liquid hydrogen. Unit has fast response time and good system stability, statistical variation, and thermal equilibrium. System accuracy is 2 percent of total density span. Basic design may be altered to include measurement of other flowing materials.

**B72-10668**  
**TWO-SPEED DEFLECTION SYSTEM FOR ELECTRON MICROPATTERN GENERATOR**  
P. R. Malmberg (Westinghouse)  
Oct. 1972  
**M-FS-22117**

Development of dual speed deflection system for electron beam micropattern generator system is discussed. Factors affecting application of electron beam lithography are analyzed. Procedure for using two speed deflection system is described.

**B72-10680**  
**AN IMPROVED DATA TRANSFER AND STORAGE TECHNIQUE FOR HYBRID COMPUTATION**  
A. M. Hansing (Lockheed Missiles and Space Co.)  
Oct. 1972  
**M-FS-22043**

Improved technique was developed for transferring and storing data at faster than real time speeds on hybrid computer. Predominant advantage is combined use of electronic relays,

track and store units, and analog-to-digital and digital-to-analog conversion units of hybrid computer.

**B72-10682**  
**LOW DISTORTION AUTOMATIC PHASE CONTROL CIRCUIT**  
G. Hauge (Martin Marietta Corp.) and C. W. Pederson (Martin Marietta Corp.)  
Oct. 1972  
**M-FS-21671**

Circuit for generation and demodulation of quadrature double side band signals in frequency division multiplexing system is described. Circuit is designed to produce low distortion automatic phase control. Illustration of circuit and components is included.

**B72-10694**  
**PEAK-POWER-POINT MONITOR FOR SOLAR PANEL**  
A. I. Schloss  
Dec. 1972  
**NPO-11708**

Attempt was made to determine solar cell panel peak power capability without disrupting power flow from panel. Separate solar cell strings were switched from panel circuits; and increasingly larger loads were added rapidly until peak power points were transversed. String wattage output was recorded and all stored string measurements summed together indicate peak power point in panel.

**B72-10724**  
**ANALYSIS OF CIRCUITS INCLUDING MAGNETIC CORES (MTRAC)**  
G. R. Hanzan, D. Nitzan, and J. R. Herndon  
Dec. 1972  
**NPO-11494**

Development of automated circuit analysis computer program to provide transient analysis of circuits with magnetic cores is discussed. Allowance is made for complications caused by nonlinearity of switching core model and magnetic coupling among loop currents. Computer program is conducted on Univac 1108 computer using FORTRAN IV.

**B72-10751**  
**ACOUSTICAL ANALYSIS SYSTEM**  
R. B. Tatge (GE) and P. F. Scott (GE)  
Dec. 1972  
**GSFC-11087**

Integrated system is described which replaces several instruments normally used to analyze acoustical data in failure detection of mechanical or fluid systems. Analysis system extracts and measures repetitive waveforms superimposed on noisy background and compares amplitude with internally stored waveforms. Equipment used in system may be interfaced with general purpose digital computer.

**B72-10752**  
**AUTOMATIC METHOD OF MEASURING SILICON-CONTROLLED-RECTIFIER HOLDING CURRENT**  
E. A. Maslowski  
Dec. 1972 - See also NASA-TM-X-2463  
**LEWIS-11898**

Development of automated silicon controlled rectifier circuit for measuring minimum anode current required to maintain rectifiers in conducting state is discussed. Components of circuit are described and principles of operation are explained. Illustration of circuit is provided.

## 03 PHYSICAL SCIENCES

**B72-10001**  
**IMPROVED LABORATORY GRADIOMETER CAN BE A FIELD SURVEY INSTRUMENT**

L. G. D. Thompson (Gen. Oceanology, Inc.), M. H. Houston (Gen. Oceanology, Inc.), D. A. Rankin (Gen. Oceanology, Inc.), and E. M. Yavner (Gen. Oceanology, Inc.)

1972

**MSC-13980**

Improvements made to quartz gradiometer minimize or eliminate disturbing effects from known error sources and permit sensitivity of  $\pm 1$  times  $10^{-9}$  to the minus 9th power/sec sq or better and measuring accuracy of  $\pm 5$  times  $10^{-9}$  to the minus 9th power/sec sq.

**B72-10003**

**URBAN AIR POLLUTION DISPERSION MODEL**

J. J. Robert

1972

**AEC-10004**

Three-dimensional integrated puff model simulates smoke plume dispersion processes and estimates pollutant concentration during periods of low wind speed. Applications for model are given.

**B72-10004**

**EFFECT OF THERMAL DISCHARGES ON THE MASS ENERGY BALANCE OF LAKE MICHIGAN**

J. G. Asbury

1972

**AEC-10013**

Effects of electric utility generating stations and steel mills on physical quality of Lake Michigan are considered. Study is based on extension of heat exchange model developed by Edinger and Geyer for small lakes and cooling ponds.

**B72-10008**

**PROPELLANT-POWERED ACTUATOR FOR GAS GENERATORS**

M. J. Makowski (TRW Systems Group)

1972

**ARC-10484**

Hydrazine operated monopropellant generators are used for spacecraft rocket engines and propellant pressurization systems. Measured work output of monopropellant actuators compares favorably with output of squib-type actuators.

**B72-10016**

**REMOTE SENSING X-RAY SPECTROMETER**

I. Adler (NASA, Goddard Space Flight Center), J. Trombka (NASA, Goddard Space Flight Center), H. Gursky (Am. Sci. and Eng., Inc.), and P. Gorenstein (Am. Sci. and Eng., Inc.)

1972

**MSC-13978**

Spectrometer measures chemical composition of lunar rocks by remote sensing from orbit and senses lunar X-rays produced by interaction of solar X-rays and elements on the lunar surface. Instrument features high sensitivity, data handling system that accumulates and prepares data for telemetry, and automatic calibration.

**B72-10020**

**SOLAR EXPERIMENT ALIGNMENT SYSTEM**

D. L. Fain (Exotech, Inc.)

1972

**ARC-10471**

Sensor system determines absolute alignment of optical axis of experiment package relative to solar vector and provides control information to permit pointing experiment anywhere on solar disc to absolute accuracy of the order of two arc seconds in center and five arc seconds on limb.

**B72-10026**

**RISING-PLATE RHEOMETER**

R. H. Globus (Aerojet Liquid Rocket Co.) and E. M. VanderWall (Aerojet Liquid Rocket Co.)

1972

**ARC-10524**

Technique eliminates hazards of handling propellants and permits determination of structure index of gel by remote control.

Rheometer weighs cone of propellant gel which remains on a disc that has been slowly pulled out of the gel.

**B72-10033**

**ANALOG TABLE LOOK-UP DEVICE IDENTIFIES UNKNOWN TERRAIN**

R. H. Dye (Bendix Corp.)

1972

**MSC-13816**

Table provides a probability map defining unknown terrain in terms of known terrain inputs. Device consists of analog transformation network and flying spot scanner. Information is useful to manufacturers and users of remote sensing equipment and applies to automated quality control.

**B72-10034**

**A LIQUID RADIATION DETECTOR WITH HIGH SPATIAL RESOLUTION**

L. Alvarez (Calif. Univ.)

1972

**MSC-13965**

Detector, using point anode, minimizes problem of oblique tracks by permitting construction of very thin counter. Detector is useful in cosmic ray and high energy physics research and X-ray and neutron diffraction technology.

**B72-10039**

**HYDRAULIC MODELING OF HEAT DISPERSION IN LARGE LAKES**

E. Silberman and H. Stefan

1972

**AEC-10003**

Case studies of hydraulic models are described for four major generating plants, including information and maps of thermal distribution. Information is of interest to agencies involved in thermal pollution control.

**B72-10048**

**PULSED HIGH-POWER ARC HEATER WITH IMPROVED CATHODE AND TRIGGERING MECHANISM**

R. Dethlefsen (Gen. Dyn./Convair) and J. Tinkham (Gen. Dyn./Convair)

1972 See also NASA-CR-1246

**ARC-10173**

System employs pulsed, constricted arc heater capable of multi-MW power, permitting quasi-stationary flow conditions during latter half of pulse of about 5 msec. System description is given.

**B72-10053**

**INCREASING THE RESPONSE OF PIN PHOTODIODES TO THE ULTRAVIOLET**

C. N. Burrous and E. E. Whiting

1972

**ARC-10274**

Solid state device uses sapphire windows and avoids coatings which absorb ultraviolet radiation and ultimately alter detector geometry. Ultimate solution for ultraviolet response is geometry with maximum peripheral area and horizontal field structure to draw out photon induced current carriers.

**B72-10082**

**VELOCITY ACCELERATOR FOR PARTICLES**

A. H. Wilson

1972

**NPO-11349**

Sheet explosive and metal tube, fitted to the inner periphery of a cam-shaped chamber, accelerate particles to velocities nearing 20 km/sec to evaluate efficacy of spacecraft meteoroid shields.

**B72-10083**

**NEMATIC LIQUID CRYSTALS FOR OPTICAL SHUTTERS: A CONCEPT**

R. E. Imus

1972

**NPO-11367**

### 03 PHYSICAL SCIENCES

Nonmechanical shutter utilizes nematic crystals to attenuate illumination, thus protecting light-sensitive devices such as vidicon or image orthicon tubes and phototubes. Opacity of liquid crystals is controlled by photosensor.

#### **B72-10085 OXYGEN-LAYER STRUCTURE IMPROVES LITHIUM-DOPED SILICON SOLAR CELLS**

P. A. Iles (Globe-Union, Inc.)  
1972

**NPO-11403**

Technique fabricates hybrid structure utilizing low oxygen silicon as bulk cell material and shallow overlay of silicon with high oxygen concentration.

#### **B72-10087 GAS LEAK-DETECTION SYSTEM**

F. G. Roselli-Lorenzini  
1972

**NPO-11405**

Data monitoring of gas leakage in satellites and spacecraft is facilitated by adding gaseous radioisotopes to cold compressed gas and mounting a detector in the thrust nozzle.

#### **B72-10107 MANGANESE BISMUTH THIN FILM FOR LARGE CAPACITY DIGITAL MEMORIES**

D. Chen (Honeywell, Inc.), R. L. Aagard (Honeywell, Inc.), F. M. Schmit (Honeywell, Inc.), and T. S. Liu (Honeywell, Inc.)  
1972

**M-FS-21246**

Material and system research defines accurate memory characteristics in regard to write, read, erase and data operations of manganese bismuth materials.

#### **B72-10113 HEXAPOLE MAGNET FIELD ANALYSIS**

R. F. Lacey (Hewlett-Packard Co.)  
1972

**GSFC-10995**

Method rotates magnet about a wire loop of rectangular shape placed inside the pole tips and measures induced loop voltage with a wave analyzer. Quantitative field characteristics are determined from voltage induced at various harmonics of the rotation frequency.

#### **B72-10123 MASS SEPARATOR FOR LOW VELOCITY IONS**

H. J. King (Hughes Aircraft Co.)  
1972 See also NASA-CR-73443

**ARC-10375**

Separator provides broad beam of protons free of other charged species to simulate the solar wind in experiments designed to determine effect on materials.

#### **B72-10127 LOW TEMPERATURE CATALYTIC IGNITION OF HYDROGEN AND OXYGEN**

H. H. Voge (Shell Develop. Co.), T. J. Jennings (Shell Develop. Co.), and W. E. Armstrong (Shell Develop. Co.)  
1972

**ARC-10492**

Catalyst composed of 32 percent iridium metal supported on granular alumina is most active and most stable of platinum metal catalysts. Catalyst consistently induces reactions at temperatures as low as 78 K.

#### **B72-10128 OPTICAL SHUTTER FOR USE IN SHOCK TUBES**

J. O. McClenahan  
1972

**ARC-10516**

Thin metal shutter that is forced into angled optical slit isolates spectrograph from high speed shock tube both optically and mechanically so neither radiation nor particulate material enters spectrograph.

#### **B72-10130 HIGH SOLAR INTENSITY RADIOMETER**

J. R. Jack and E. W. Spisz  
May 1972 See also NASA-TM-X-2412  
**LEWIS-11533**

Silicon solar cells are used to measure visible radiant energy and radiation intensities to 20 solar constants. Future investigations are planned for up to 100 solar constants. Radiometer is small, rugged, accurate and inexpensive.

#### **B72-10132 GLASS TECHNOLOGY INVOLVED IN THE MANUFACTURE OF MAGNETOMETER COMPONENTS**

G. Bergen

1972

**GSFC-11283**

Glass technology has developed quicker and less costly techniques in sealing and vacuum processing which result in improved lamps and bulbs, thus producing a less costly and more reliable instrument package.

#### **B72-10140 GRAVITATIONAL GRADIOMETER MEASURES MASS CHANGES**

C. C. Bell (Hughes Res. Labs.)  
1972

**M-FS-20814**

Differential angular accelerometer, utilizing complex geometric configurations and spring-coupled rotating masses, demonstrates feasibility of measuring mass distributions of celestial bodies by detecting spatial gradients of their fields from orbiting vehicles. Applications include mineralogical surveying, geodetic engineering, and solar system investigation.

#### **B72-10143 ATMOSPHERIC DENSITY VARIATIONS RELATED TO INTERNAL GRAVITY WAVES**

E. B. Miller (Northrop Corp.)  
1972

**M-FS-21637**

Report describes method for estimating gravity-wave density variation from wind speed profile between 60 and 100 km. Single profile is inadequate for valid determination of mean or background values and ensemble averaging over several related profiles is recommended.

#### **B72-10146 LOW TEMPERATURE SCALE FOR A 1 TO 20 DEGREE KELVIN REGION**

T. C. Cetas and C. A. Swenson  
1972

**AEC-10007**

New temperature scale, accurate to better than plus or minus 0.001 Kelvin over low temperature region, is based on National Bureau of Standards 1955 platinum resistance thermometer scale and utilizes precise susceptibility measurements on two paramagnetic salts.

#### **B72-10147 CONICAL ELECTROMAGNETIC RADIATION FLUX CONCENTRATOR**

E. R. Miller

May 1972

**M-FS-21613**

Concentrator provides method of concentrating a beam of electromagnetic radiation into a smaller beam, presenting a higher flux density. Smaller beam may be made larger by sending radiation through the device in the reverse direction.

#### **B72-10148 DEVICE FOR MEASURING ELECTRIC FIELDS**

S. H. Levine (Northrop Corp. Labs.) and S. R. Harrison (Northrop Corp. Labs.)

1972 See also NASA-CR-73177

**ARC-10164**

Measurement of low-intensity electric fields in space and in

presence of weak magnetic fields is accomplished by utilizing a device which permits determination of the extent a beam of cesium ions is deflected by an electric field.

**B72-10151**

**ADVANCES IN INDUCTION-HEATED PLASMA TORCH TECHNOLOGY**

J. W. Poole (Humphreys Corp.) and C. E. Vogel (Humphreys Corp.)

May 1972 See also B69-10185; NASA-CR-1764;

NASA-CR-1804

**LEWIS-11354**

Continuing research has resulted in significant advances in induction-heated plasma torch technology which extend and enhance its potential for broad range of uses in chemical processing, materials development and testing, and development of large illumination sources. Summaries of these advances are briefly described.

**B72-10152**

**ADVANCED INFRARED PHOTOMULTIPLIER**

H. Sonnenberg (Sylvania Electron. Systems-West) and J. D. Taynal (Sylvania Electron. Systems-West)

1972

**M-FS-20941**

Photocathode for the 8500 angstrom through 9000 angstrom range, improving efficiency by an order of magnitude, is achieved with a gallium arsenide cesium oxide photocathode. Protection of the GaAs surface from contamination during bake-out is another important function.

**B72-10154**

**METHOD OF DETERMINING THERMAL CONDUCTIVITY IN MULTI-LAYER INSULATION SYSTEMS**

K. G. Scroggins (Brown Eng. Co.)

May 1972

**M-FS-20213**

Repeatable nondestructive method prepares multilayer cryo-insulation material for thermal conductivity measurements. Data acquired are volume of boil-off gas, barometric pressure, gas temperature, chamber pressure, and differential pressure between extremities.

**B72-10160**

**PARTICLE DETECTION BY A LIGHT-SCATTERING TECHNIQUE**

S. Kormanyos (Bendix Corp.) and J. Mastroeni (Bendix Corp.)

1972

**ARC-10384**

Instrument measures concentration of small particles in aqueous medium in terms of amount of light scattered and degree to which light transmission is attenuated. Sensitivity to small particles is optimized because both scattered and transmitted illumination levels are detected by photodiodes.

**B72-10166**

**CELL FOR ELECTROLYSIS OF WATER VAPOR**

V. A. Celino (Hamilton Standard) and G. Roebelen (Hamilton Standard)

1972

**ARC-10521**

Electrolytic cells regenerate oxygen from the water vapor in the air of closed-loop life-support system and remove water vapor from air circulated through them. Water is converted into oxygen and hydrogen; the oxygen is returned to the air, the hydrogen is vented or used elsewhere.

**B72-10169**

**FEEDBACK CONTROL OF VARIABLE CONDUCTANCE HEAT PIPES**

W. B. Bienert (Dynatherm Corp.)

1972 See also NASA-CR-73475

**ARC-10460**

Feedback system monitors source temperature and makes necessary changes of area available for heat rejection by adjusting

storage volume of noncondensable gas and position of vapor/gas interface.

**B72-10170**

**VIBRATING RIBBON BOLOMETER: A CONCEPT**

J. Dimeff

1972

**XAC-10768**

Incident electromagnetic radiation pulses maintain bolometer's sensitive element in state of resonant oscillation and correlate amplitude of oscillation with incident radiation power. Bolometer can be employed with other devices for detecting motion of ribbon.

**B72-10171**

**ANNULAR OBJECTIVE APERTURES IMPROVE RESOLUTION OF ELECTRON MICROSCOPES**

K. Heinemann and H. R. Poppe

1972

**ARC-10448**

Hollow-cone illumination techniques, using an annular objective aperture located behind back focal plane of objective lens, increase image contrast and minimize chromatic aberrations.

**B72-10180**

**CRYOGENIC GEL FLOW VISCOMETER**

R. H. Globus (Aerojet Liquid Rocket Co.) and E. M. VanderWall (Aerojet Liquid Rocket Co.)

1972

**ARC-10523**

Coiled section of tubing measures viscous properties of gelled cryogenic propellants under conditions closely resembling flow in rocket engine systems. Characteristic flow curve provides data necessary for the design of prototype hardware systems using the liquid or gel of interest.

**B72-10188**

**RESTARTABLE HEAT PIPE**

A. P. Shlosinger (TRW Systems Group)

1972

**ARC-10198**

Inclusion in heat pipe of auxiliary working fluid which has considerably lower freezing point than main working fluid enables easy starting after main working fluid has been cooled to or below freezing point.

**B72-10190**

**HAND-HELD PHOTOMICROSCOPY SYSTEM**

H. R. Zabower

May 1972

**ARC-10468**

Photomicroscopy system, with simple optics and any standard microscope objective, is used with any type of motion picture, still, or television camera system. Device performs well under difficult environmental conditions and applies to work in ecological studies, field hospitals, and geological surveys.

**B72-10192**

**SOLAR SENSOR WITH AUTOCOLLIMATOR**

D. L. Fain (Exotech, Inc.), J. M. Hall (Exotech, Inc.), and D. F. Johnson (Exotech, Inc.)

May 1972 See also NASA-CR-73260

**ARC-10148**

Monolithic structure, consisting of fused quartz fabricated solar sensor and autocollimator, measures angle between reference surface on spacecraft and solar vector. Device compensates for errors caused by changes in the alignment of its mountings or component parts. Integrated concept is advantageous whenever sensor mounting errors constitute problems.

**B72-10196**

**WIDE-RANGE DYNAMIC PRESSURE SENSOR**

J. Dimeff and J. W. Lane

May 1972 See also NASA-SP-5020

**ARC-10263**

Transducer measures pressure by sensing the damping of a

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vibrating diaphragm immersed in the atmosphere to be measured. Improved sensor can be included in rugged, lightweight package for use aboard aircraft, meteorological vehicles, and space probes.

#### **B72-10198 NONDISPERSIVE INFRARED ANALYZER FOR SPECIFIC GASES IN COMPLEX MIXTURES**

J. Dimeff, R. W. Donaldson, Jr., W. D. Gunter, and G. J. Deboo  
May 1972

**ARC-10308**

Analyzer identifies and measures particular diatomic or polyatomic gases in complex gas mixtures. Mixing of absorption effects on light energy passing through gases to photodetector produces a signal component that is related to the absorption caused by reference-gas component in unknown gas mixture.

#### **B72-10202 FABRICATION OF LARGE CERAMIC ELECTROLYTE DISKS** S. A. Ring (Appl. Electrochem., Inc.)

May 1972

**ARC-10320**

Process for sintering compressed ceramic powders produces large ceramic disks for use as electrolytes in high-temperature electrolytic cells. Thin, strain-free uniformly dense disks as large as 30 cm squared have been fabricated by slicing ceramic slugs produced by this technique.

#### **B72-10206 DIATOMIC INFRARED GASDYNAMIC LASER PERMITS SELECTION OF WAVELENGTHS**

R. L. McKenzie

May 1972 See also NASA-TM-X-62006

**ARC-10370**

Laser utilizes infrared-active diatomic gas which emits laser energy from numerous upper vibrational levels. Wavelengths depend on particular vibration-rotation transitions and have been obtained throughout the band between 4.78 and 5.4 microns, for example, when using carbon monoxide.

#### **B72-10207 SIMPLE GAS CHROMATOGRAPHIC SYSTEM FOR ANALYSIS OF MICROBIAL RESPIRATORY GASES**

G. C. Carle

May 1972

**ARC-10403**

Dual column ambient temperature system, consisting of pair of capillary columns, microbead thermistor detector and micro gas-sampling valve, is used in remote life-detection equipment for space experiments. Performance outweighs advantage gained by utilizing single-column systems to reduce weight, conserve carrier gas and operate at lower power levels.

#### **B72-10208 HYDROGEN ELIMINATOR**

R. J. Kiraly (TRW, Inc.)

May 1972

**ARC-10408**

Vented hydrogen is converted into water by mixing hydrogen with sufficient air to ensure that a flame cannot be maintained and then passing it through a reactor containing palladium catalyst; reaction takes place at relatively low temperature. Device may have wide range of applications for air purification.

#### **B72-10209 SENSITIVE HOLOGRAPHIC DETECTION OF SMALL AERODYNAMIC PERTURBATIONS**

L. O. Heflinger (TRW Systems Group)

May 1972 See also NASA-CR-114274

**ARC-10422**

Phase modulations enhance the sensitivity of holographic techniques for detecting disturbances which are caused by variations in gas density of the order of 1/10 wavelength or less. In the readout, subject perturbations show up as brightenings on a dark background.

#### **B72-10212 RADIOISOTOPE THERMIONIC POWER SUPPLY FOR SPACECRAFT**

W. G. Homeyer (Gulf Gen. Atomic), A. J. Gietzen (Gulf Gen. Atomic), and C. A. Heath

May 1972

**ARC-10438**

Power supply design for unmanned electric propulsion missions to outer planets utilizes a store of curium-244 in compact array of capsules as energy source. Supply subassemblies are: heat source, converter equipment which supplies power, and safety equipment. System is designed for a 72,000 hour mission.

#### **B72-10217 LIQUID-HELIUM-COOLED MICHELSON INTERFEROMETER** G. C. Augason and N. Young (Block Eng.)

May 1972

**ARC-10554**

Interferometer serves as a rocket-flight spectrometer for examination of the far infrared emission spectra of astronomical objects. The double beam interferometer is readily adapted to make spectral scans and for use as a detector of discrete line emissions.

#### **B72-10221 SILVER-CHLORINE FUEL CELL: A CONCEPT**

M. Lieberman (ESSO Res. and Eng. Co.)

1972 See also NASA-CR-94407

**ARC-10491**

Fuel cell regenerated by photochemical reduction enables novel slurry system to transport particles of reduced silver between regenerator section and anode. Fundamental reactions which provide electrical power from the fuel cell are given.

#### **B72-10227 SIMPLE DYNAMIC ELECTROMAGNETIC RADIATION DETECTOR**

J. F. Been

May 1972

**LEWIS-11159**

Detector monitors gamma dose rate at particular position in a radiation facility where a mixed neutron-gamma environment exists, thus determining reactor power level changes. Device also maps gamma intensity profile across a neutron-gamma beam.

#### **B72-10232 IMPROVED INTENSIFYING SCREEN REDUCES X-RAY EXPOSURE**

R. A. Buchanan (Lockheed Aircraft Corp.)

May 1972

**AEC-10090**

X-ray intensifying screen may make possible radiographic procedures where detection speed and X-ray tube power have been the limiting factors. Device will reduce total population exposure to harmful radiation in the United States.

#### **B72-10240 LABORATORY LEAK TESTER PROVIDES HIGH SENSITIVITY**

E. G. Hayes

May 1972

**AEC-10042**

Detecting unit is capable of measuring leak rates of 10 to the minus 5th power cc/sec or less. Device can be mounted in a carrying case and consists of three vacuum chambers, two pressure gages, and positive seal type control valves.

#### **B72-10242 IMPROVED HIGH-PERFORMANCE SHOCK TUBE**

W. A. Menard

Aug. 1972

**NPO-11885**

Mylar diaphragms in shock tubes are a major improvement over steel diaphragms. Other improvements include: better electrode design; improved flow by opening the throat and

removing all constrictions; and improved driver geometry by optimizing volume and shape.

**B72-10244**  
**DIRECT ANALYSIS OF HYDROGEN/DEUTERIUM MIXTURES: A CONCEPT**

H. C. Lord  
Sep. 1972  
NPO-11322

Fraction of deuterium/hydrogen mixture is isolated by column chromatography, ionized, and the HD+1-0 band absorption measured with conventional high-resolution infrared spectrophotometer.

**B72-10246**  
**WATER CAVITY DEGASSER FOR ELECTROLYSIS CELLS**

F. H. Schubert (TRW, Inc.)  
Sep. 1972  
ARC-10244

Degasser, a cylindrical container made of plastic thick enough to withstand operating pressures of electrolysis module, removes accumulated gases from water cavities without loss of electrolyte.

**B72-10248**  
**PRESSURE-PROBE ASSEMBLY FOR WIND TUNNELS**

R. L. Warfield (Boeing Co.)  
Sep. 1972  
ARC-10569

Rake mounting design reduces aerodynamic-surface discontinuities to a minimum when installed in boundary layer bleed area. Mounting base is not required and, because of simplicity, rake can be manufactured at low cost.

**B72-10251**  
**AN ELECTROHYDRODYNAMIC HEAT PIPE**

T. B. Jones (Colo. State Univ.)  
Sep. 1972  
ARC-10601

Dielectric liquid for transfer of heat provides liquid flow from the condenser section to the evaporator section in conventional heat pipes. Working fluid is guided or pumped by an array of wire electrodes connected to a high-voltage source.

**B72-10259**  
**HIGH EFFICIENCY COLLECTOR FOR MICROWAVE TUBES**

H. C. Kosmahl  
Jun. 1972 See also NASA-TN-D-6093  
LEWIS-11192

Depressed collector has basic configuration of a dish with a central cone and protruding spike. This geometry velocity sorts and slows the electrons down to minimum velocity at collection, and prevents backstreaming of secondaries and reflected primaries into interaction region of the tube.

**B72-10260**  
**HYBRID HOLOGRAPHIC SYSTEM**

R. L. Kurtz and B. N. Norden  
Jun. 1972  
M-FS-20074

Improved holographic system has high degree of resolution and capability of providing a hologram of a moving object without requiring that the system have a high mechanical stability.

**B72-10263**  
**EVALUATION OF JET ENGINE NOISE**

S. P. Pao (Wyle Labs.)  
Jun. 1972  
M-FS-21416

Three basic equations, acoustic mode and two Mach modes, characterize jet noise environments. These equations are used to predict noise generation magnitude.

**B72-10270**  
**SEPARATION OF GAS MIXTURES BY CENTRIFUGATION**

C. Park and W. L. Love  
1972

**ARC-10449**

Magnetohydrodynamic (MHD) centrifuge utilizing electric currents and magnetic fields produces a magnetic force which develops supersonic rotational velocities in gas mixtures. Device is superior to ordinary centrifuge because rotation of gas mixture is produced by MHD force rather than mechanical means.

**B72-10273**  
**OXYGEN RECLAMATION WITH SOLID OXIDE ELECTROLYTES**

W. Smart (Appl. Electrochem., Inc.) and J. Weissbart (Appl. Electrochem., Inc.)  
Jul. 1972 See also NASA-CR-73464

**ARC-10487**

Electrolyte operated at an elevated temperature in an electrolysis cell regenerates oxygen from metabolic carbon dioxide found in closed-cycle cabin atmospheres.

**B72-10274**  
**INTERFEROMETRIC ROTATION SENSOR**

T. M. Walsh  
Jul. 1972  
ARC-10278

Sensor generates interference fringes varying in number (horizontally and vertically) as a function of the total angular deviation relative to the line-of-sight axis. Device eliminates errors from zero or null shift due to lack of electrical circuitry stability.

**B72-10276**  
**THERMAL CONTROL FOR STORAGE OF CRYOGENIC PROPELLANTS IN A COMMON-BULKHEAD TANK: A CONCEPT**

G. R. Stone (Gen. Dyn./Convair)  
Sep. 1972 See also B72-10277; B72-10278;  
NASA-CR-109833

**ARC-10558**

Simple, reliable ground-hold refrigeration system for common-bulkhead tank meets design criteria and objectives for ground-hold of oxygen difluoride and diborane. System is failsafe and malfunctions can be rectified without interruption of basic system functions.

**B72-10277**  
**SAFE TRANSPORT OF DIBORANE IN A DUAL REFRIGERANT SYSTEM: A CONCEPT**

G. R. Stone (Gen. Dyn./Convair)  
Sep. 1972 See also B72-10276; B72-10278;  
NASA-CR-109833

**ARC-10559**

Mobile transport system, that can be carried by truck and parked in storage area, consists of an inner container capable of holding 363 kg of diborane and an external, dual refrigeration unit which uses liquid nitrogen and Freon-14.

**B72-10278**  
**THERMAL CONTROL FOR STORAGE OF CRYOGENIC PROPELLANTS IN A MULTIPLE-TANK SYSTEM: A CONCEPT**

G. R. Stone (Gen. Dyn./Convair)  
Sep. 1972 See also B72-10276; B72-10277;  
NASA-CR-109833

**ARC-10560**

Development of system for storing cryogenic propellants in multiple tank configuration is discussed. System uses single loop and closed loop features. Liquid nitrogen and Freon-14 are used as refrigerants. Diagram of equipment to show components and operation is provided.

**B72-10302**  
**MULTIPURPOSE TOP FOR LIQUID HELIUM DEWAR**

R. S. Murphy and J. R. Anderholm  
Sep. 1972  
ARC-10533

Multipurpose top was fabricated for liquid helium Dewar flask which guards against flash vaporization of liquid helium and allows boiling temperature of liquid helium to be lowered

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by reduction of ambient pressure in Dewar flask. Device is rugged and simple, and does not require frequent calibrations or adjustments.

#### **B72-10307 REDIRECTING ELECTROMAGNETIC BEAMS THROUGH WIDE ANGLES**

J. Dimeff, R. M. Brown, and M. Omura

Sep. 1972

**ARC-10602**

Electromagnetic wave enters reflector array consisting of grid work of metallic reflectors with each reflector obscuring a portion of its neighbors to prevent direct passage of wave through grid. Antenna movement involves reduced amplitude of angular motion and internal cancellations of translational and rotational inertias.

#### **B72-10310 OPTICAL ENHANCEMENT OF SENSITIVITY IN LASER DOPPLER VELOCITY SYSTEMS**

G. R. Grant, W. D. Gunter, Jr., and S. A. Shaw

Sep. 1972 See also B71-10113

**ARC-10653**

Utilization of optical enhancement techniques prevents loss of light by reflections at the photocathode of a photomultiplier and increases signal detection sensitivity.

#### **B72-10312 A SENSITIVE IMAGE INTENSIFIER WHICH USES INERT GAS**

Q. A. Kerns (Calif. Univ.) and H. M. Miller (Calif. Univ.)

Dec. 1972

**LRL-10024**

High gain optical image intensifier utilizes inert gas cavity with copper electrodes to form electron avalanches without excessive pulse voltages. Estimated optical gain for device is two times 10 to the power of seven.

#### **B72-10314 A CRYOPUMP FOR COOLING OBJECTS AT A DISTANCE**

P. J. Batson and N. Milleron

Dec. 1972

**LRL-10031**

Design and construction of cryopump is reported that feeds from primary source to cool component up to 30 ft from source. Liquid oxygen or nitrogen is gravity fed through loop system to copper fibers enclosing component at room temperature where fluid boils, cools object, vaporizes and recycles through tubing loop.

#### **B72-10317 SUNSPOT ANALYSIS AND PREDICTION**

Innovator not given (Ark. Univ.) Jul. 1972

**M-FS-21724**

Evaluation of several procedures that apply rarely used and exotic mathematical functions yields a unique method of application of common trigonometric functions. These functions appear to produce results in the development of a mathematical model capable of describing all available sunspot data.

#### **B72-10324 BAFFLE TO CONFINED GLOW DISCHARGE IN ION PUMP**

E. S. J. Wang (McDonnell-Douglas Corp.)

Jul. 1972

**M-FS-21575**

Electrically-grounded 'optically tight' baffle installed downstream from conventional metal screen prevents discharge from entering test chamber and disturbing test process.

#### **B72-10327 A COMPACT SPECTRORADIOMETER FOR SOLAR SIMULATOR MEASUREMENTS**

H. H. Seward (MIT), I. G. McWilliams (MIT), and G. A. Davidson (MIT)

Jul. 1972

**HQ-10683**

Compact spectral irradiance probe has been designed and

built which uses wedge filter in conjunction with silicon cell and operational amplifier. Probe is used to monitor spectral energy distribution of solar simulators and other high intensity sources.

#### **B72-10341 ACOUSTIC SPECTRAL ANALYSIS AND TESTING TECHNIQUES**

C. D. Hayes, M. D. Lamers, J. W. Shipley, and R. A. Slusser  
Jul. 1972 See also JPL-TM-33-422; JPL-TR-32-928-Rev-1; JPL-TR-32-1052; JPL-TR-32-1141

**NPO-11554**

Subjects covered in four reports are described including: (1) mathematical techniques for combining decibel levels of octaves or constant bandwidth; (2) techniques for determining equation for power spectral density function; (3) computer program to analyze acoustical test data; and (4) computer simulation of horn responses utilizing hyperbolic horn theory.

#### **B72-10351 COMPOSITE MOBILE SYSTEM FOR HOLOGRAPHIC NONDESTRUCTIVE TESTING**

R. L. Kurtz

Jul. 1972

**M-FS-21704**

Innovation provides a single system flexible enough to test objects ranging from large amplitude displacement and/or velocities down to extremely small displacements and/or velocities by making only a few minor adjustments in the component arrangements.

#### **B72-10354 HELIUM LEAK MEASUREMENTS USING CO2 AS A CARRIER**

B. C. Moore (McDonnell-Douglas Astronautics Co.) and R. G. Camarillo (McDonnell-Douglas Astronautics Co.)

Jul. 1972

**M-FS-21742**

Detection delay defects are omitted by using helium mass spectrometer leak detector combined with several known procedures. Technique combines carbon dioxide purging, cryogenic separating helium accumulation, and use of carbon dioxide as carrier gas.

#### **B72-10360 ALTERNATING CURRENT LOSSES IN SUPERCONDUCTING COILS**

S. L. Wipf (N. Am. Rockwell Corp.) and C. A. Guderjahn (N. Am. Rockwell Corp.)

Jun. 1972

**M-FS-21129**

Report examines relationship between coil loss and frequency and heat loss in coil as a function of the magnetic field H. Information is of value to manufacturers of superconducting magnets, motors and generators.

#### **B72-10368 SONIC LIMITATIONS AND STARTUP PROBLEMS OF HEAT PIPES**

J. E. Deverall, J. E. Kemme, and L. W. Florschuetz

Jun. 1972 See also LA-4518

**AEC-10036**

Introduction of small amounts of inert, noncombustible gas aids startup in certain types of heat pipes. When the heat pipe is closely coupled to the heat sink, the startup system must be designed to bring the heat sink on-line slowly.

#### **B72-10373 LASER FREQUENCY MODULATION WITH ELECTRON PLASMA**

T. J. Burgess and V. R. Latorre

Jun. 1972

**AEC-10079**

When laser beam passes through electron plasma its frequency shifts by amount proportional to plasma density. This density varies with modulating signal resulting in corresponding modula-



tion of laser beam frequency. Necessary apparatus is relatively inexpensive since crystals are not required.

#### B72-10375

#### OPTICAL DEVICE FOR PRODUCING COLOR LINE SCAN DISPLAY FROM MONOCHROME OSCILLOSCOPE TRACES

L. P. Kopia

Jul. 1972

#### LANGLEY-10896

Novel device allows generation of simultaneous color line scan from the face of a monochrome cathode ray tube. Device consists of four dichroic beam splitters, two each of red reflectance (cyan transmittance) and blue reflectance (yellow transmittance).

#### B72-10379

#### FILTER CASSETTE FOR HIGH VOLUME AIR SAMPLER

R. B. King, J. S. Fordyce, L. Rosenblum, J. Toma, J. C. Burr, Jr. (Cleveland Div. of Air Pollution Control), and B. L. Burger (EPA)

Jul. 1972

#### LEWIS-11469

Filter cassette eliminates or substantially reduces contamination of filter media by extraneous material and facilitates handling.

#### B72-10387

#### ROTARY SHUTTER MECHANISM CONTAINS OPTICAL ELEMENTS

A. O. Weilbach (Beckman Instr., Inc.)

Dec. 1972

#### GSFC-11244

Two cylindrical shutter mechanisms having fixed outer sleeves and rotating inner sleeves use single stepping motor and Geneva mechanism to sequentially move optical components into path of ultraviolet monochromator for output control to photomultiplier. Photometric and wavelength calibration sources insure shutter positions according to operational phases.

#### B72-10388

#### AN IMPROVED APOCHROMATIC WEDGE UTILIZING OPTICAL MOLECULAR CONTACT BONDING

C. M. Fewell (Sperry Rand Corp.)

Jul. 1972

#### GSFC-11082

Three elements of the apochromatic wedge are assembled by optical molecular contact, eliminating all difficulties and inaccuracies inherent in cement bonding.

#### B72-10389

#### TRANSMISSION OF OPTICAL FREQUENCIES WITH MINIMAL LOSSES

C. H. Townes (MIT), R. Y. Chiao (MIT), and E. M. Garmire (MIT)

Jul. 1972

#### HQ-10541

Application of diffractionless dielectrics as transmitting media between laser beam source and receiver is discussed. Optical properties of transmitting media are described and general system diagram is illustrated. Use of system in power transmission, communications, surgery, and machinery is explained.

#### B72-10435

#### ALIGNMENT MICROSCOPE FOR ROTATING LASER SCANNER

A. Maciel, Jr. (Singer-Gen. Precision, Inc.) and J. C. Beck (Singer-Gen. Precision, Inc.)

Dec. 1972

#### MSC-14118

Microscopic assembly for alignment of rotary laser focuses on small film area along scan line at oblique angle. Suitable choice of angle and location of optical components project laser beam line as X coordinate reticle. Coordination with horizontal reticle line included in microscope facilitates Y coordinate position indexing.

#### B72-10440

#### EFFICIENT WIRE-GRID DUPLEXER-POLARIZED FOR CO<sub>2</sub> LASERS

P. K. Cheo (Aerojet-Gen. Corp.) and C. D. Bass (Aerojet-Gen. Corp.)

Dec. 1972

#### GSFC-11403

Chromium wire grid duplexer-polarizer for 10 micrometer carbon dioxide laser communication system is produced by depositing photo-resist film onto silicon substrate, grating by

two collimated cadmium helium laser beams, covering of surface with thin chromium layer, and subsequent stripping of uncoated portion to expose etched wires.

#### B72-10443

#### HIGH TEMPERATURE PERMEAMETER FOR MEASURING MAGNETIC PROPERTIES

J. P. Barranger

Aug. 1972 See also NASA-TN-D-6659

#### LEWIS-11609

Instrument for measuring magnetic permeability of materials undergoing heat treatment as method for monitoring stress relief and tempering is described. Procedure is based on magnetic potentiometer principle with yoke compensating coils to cancel effects of reluctance of yoke and joint gaps. Instrument is heated with specimen being heat treated.

#### B72-10460

#### RADIOLOGICAL CONTROL MANUAL

J. W. Noblin

Aug. 1972

#### M-FS-22092

Objectives of the manual are to (1) ensure compliance with requirements of AEC and governmental health agencies, (2) ensure against excessive and unnecessary exposure of personnel to harmful radiation, and (3) prevent contamination of equipment, materials, and environment with radioactive materials.

#### B72-10465

#### MAGNETS WITH STABILIZED CONDUCTORS

C. K. Jones (Westinghouse Elec. Corp.) and J. R. Gavalier (Westinghouse Elec. Corp.)

Aug. 1972

#### HQ-10727

Method fabricates stabilized composite conductor, for use in construction of magnets, using equal amounts of superconducting and metal materials, thus reducing weight, cost and size.

#### B72-10472

#### FREQUENCY-WAVELENGTH CALCULATOR WITH TABLE OF DIELECTRIC PROPERTIES

L. L. Thompson

Aug. 1972

#### GSFC-11200

Frequency-wavelength calculator has been developed which rapidly and accurately calculates wavelength of given frequency in specific dielectric material. Unit fits into shirt pocket and includes table of dielectric properties and one-step calculator.

#### B72-10478

#### WIDE-RANGE NUCLEAR MAGNETIC RESONANCE DETECTOR

J. C. Sturman and R. J. Jirberg

Aug. 1972 See also NASA-TN-D-6338

#### LEWIS-11513

Compact and easy to use solid state nuclear magnetic resonance detector is designed for measuring field strength to 20 teslas in cryogenically cooled magnets. Extremely low noise and high sensitivity make detector applicable to nearly all types of analytical nuclear magnetic resonance measurements and can be used in high temperature and radiation environments.

#### B72-10485

#### METASTABLE ATOM PROBE FOR MEASURING ELECTRON BEAM DENSITY PROFILES

J. M. Lockhart (Mich. Univ.) and J. C. Zorn (Mich. Univ.)

Aug. 1972

#### M-FS-21593

Metastable atom probe was developed for measuring current density in electron beam as function of two arbitrary coordinates, with spatial resolution better than 0.5 mm. Probe shows effects of space charge, magnetic fields, and other factors which influence electron current density, but operates with such low beam densities that introduced perturbation is very small.

#### B72-10487

#### A COMPTON SCATTER ATTENUATION GAMMA RAY SPECTROMETER

W. E. Austin (GE)

Aug. 1972

#### M-FS-21441

Compton attenuation technique, utilizing semiconductor sum-Compton detectors, has been proposed for gamma ray

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spectrometer capable of gamma spectral measurements in radiation fields of 100 R/hr to one million R/hr. Spectrometer consists of two or more separate detectors, with only primary detector exposed to primary incident photon flux.

**B72-10495**

### INTERFEROMETRIC MEASUREMENT OF THE VELOCITY OF RADIATING PARTICLES

S. Aisenberg (Space Sci., Inc.)

Aug. 1972

HQ-10371

Electro-optical system for measuring very small Doppler shift displacements of spectral wavelengths emitted by atoms and ions in high velocity plasma beam is discussed. Operation of circuits is described and circuit diagram is included.

**B72-10500**

### FLEXIBLE SHIELDING SYSTEM FOR RADIATION PROTECTION

A. Babin

Dec. 1972

LRL-10028

Modular construction of low cost flexible radiation shielding panels consists of water filled steels cans, zinc bromide windows, turntable unit, master-slave manipulators, and interlocking lead bricks. Easy modifications of shielding wall thicknesses are obtained by rearranging overall geometry of portable components.

**B72-10516**

### PARTICLE DETECTION WITH INTENSIFIED LASER BEAM

R. G. Knollenberg (Chicago Univ.)

Aug. 1972

HQ-10645

Application of external and laser output mirrors to produce intensified light beam for measurement of light scattered by dispersed particles is described. Use of fiber optics bundles to collect light is discussed. Diagram of equipment and principles of operation are presented.

**B72-10520**

### ACOUSTO-OPTIC FILTER FOR ELECTRONIC LASER TUNING

S. E. Harris (Stanford Univ.)

Dec. 1972

HQ-10715

Electronically tunable lithium niobate filter utilizes acoustic-optic diffraction for tuning laser to desired frequencies. Filter placed inside laser cavity diffracts incident optical signal of one polarization into orthogonal polarization by collinearly propagating acoustic beam to desired wavelength.

**B72-10521**

### IMPROVED OPTICAL FILTERS FOR AUTOMATED VISUAL INSPECTION

D. A. Curtis (Little / Arthur D. / Inc.)

Aug. 1972

HQ-10720

Sides of spatial filter slits are shaped so that their contribution to signal is reduced, thus minimizing the number of scanning errors.

**B72-10524**

### AN ABSORPTION SPECTRUM AMPLIFIER FOR DETERMINING GAS COMPOSITION

E. F. Zalewski (NBS), N. C. Peterson (NBS), M. J. Kurylo (NBS), A. M. Bass (NBS), W. Brown (NBS), and R. A. Keller (NBS)

Aug. 1972

HQ-10752

Compositions of gas samples are frequently studied by laser absorption spectroscopy. Sensitivity is improved by two orders of magnitude when absorption cell is placed inside an organic-dye laser cavity.

**B72-10528**

### HIGH-INTENSITY SOURCE OF EXTREME ULTRAVIOLET

E. Paresce (Calif. Univ.), S. Kumar (Calif. Univ.), and S. Bowyer

(Calif. Univ.)

Aug. 1972

HQ-10754

High intensity ultraviolet radiation source was developed which is suitable for emission below 500 Å. Source, useful for 100 to 1000 Å range, is simple and inexpensive to construct, easy to operate, and very stable. Because of sufficiently intense output spectrum, source can be used with monochromator at wavelengths as low as 160 Å.

**B72-10532**

### TEMPERATURE CONTROL OF A CRYOGENIC BATH

I. M. Asher (MIT)

Aug. 1972

HQ-10788

Foreign gas introduced into vapor phase above liquid region cools cryogenic baths. Equipment consists of gas tank and cover of styrofoam. Helium is considered the best choice to produce cooling, though any gas with boiling point lower than that of bath liquid may be used.

**B72-10549**

### HYDROPHOBIC LIQUID/GAS SEPARATOR FOR HEAT PIPES

B. D. Marcus (TRW Systems Group)

Sep. 1972

ARC-10656

Perforated nonwetting plug of material such as polytetrafluoroethylene is mounted in gas reservoir feed tube, preferably at end which extends into heat pipe condenser section, to prevent liquid from entering gas reservoir of passively controlled heat pipe.

**B72-10554**

### OVERFLOW SENSOR FOR CRYOGENIC FLUID VESSELS

W. M. Tener

Sep. 1972

NPO-10619

Overflow sensor for cryogenic fluid vessels has been designed by winding electrical resistance element on porous tubular coil form. Form is positioned in overflow vent of cryogenic fluid vessel where it can differentiate vapor from liquid at same temperature.

**B72-10556**

### HELIUM WINDOW FOR SHOCK-TUBE MONOCHROMATORS

G. M. Thomas

Sep. 1972

NPO-11852

Technique for coupling vacuum ultraviolet monochromator to shock tube to avoid loss of high energy ultraviolet light during quantitative measurements is described. System consists of helium gas window pumping through small aperture in entrance pupil of monochromator. Diagram of equipment and principles of operation are presented.

**B72-10563**

### MEASUREMENT OF ELECTRON DENSITY AND TEMPERATURE IN PLASMAS

K. W. Billman, P. D. Rowley, L. L. Presley, and J. Stallcop

Sep. 1972

ARC-10598

Application of two laser wavelengths passing through plasma measures electron density and temperature. Function depends on determining absorption of light at two wavelengths. Nature of reaction is explained and schematic diagram of equipment is included.

**B72-10567**

### REMOTE MEASUREMENT OF THE WATER CONTENT OF SNOWPACKS

W. I. Linlor

Sep. 1972

ARC-10651

Electronic equipment for sensing moisture content of snowpacks is described. Components of electronic test equipment

are illustrated and methods of conducting tests are explained. Possibilities for airborne sensing are examined.

**B72-10571  
LASER MASS SPECTROMETER**

K. A. Lincoln

Sep. 1972

**ARC-10687**

Development of time of flight mass spectrometer using laser powered vaporization source is discussed. Operation of equipment to measure thermal velocities of individual mass species is described. Illustration of test equipment installation and detailed line drawing of ion producing equipment are provided.

**B72-10572  
OSCILLATION OF LASER-BEAM INTENSITY AS OBSERVED WITH BEAM SPLITTERS**

D. M. Kuehn

Sep. 1972

**ARC-10694**

Characteristics of nearly perfectly flat beam splitter for observing laser pulse shapes are discussed. Disadvantages of conventional instruments for observing properties of laser beams are described. Effects of high frequency noise on accuracy of measurement are reported.

**B72-10611  
A TRANSMITTING AND REFLECTING DIFFUSER FOR ULTRAVIOLET LIGHT**

L. S. Keafer, Jr., E. E. Burcher, and L. P. Kopia

Jan. 1972

**LANGLEY-10385**

Fabrication of ultraviolet radiation diffusing layer in configuration that uses ultraviolet properties of fused silica condensate is discussed. Construction and operation of the device are described. Diagram of reflecting diffuser to show construction and method of operation is included.

**B72-10629  
MAGNETOMETER USES BISMUTH-SELENIDE**

J. A. Woollman, I. L. Spain (Md. Univ.), and H. Beale (Calif. Univ.)

1972

**LEWIS-11632**

Characteristics of bismuth-selenide magnetometer are described. Advantages of bismuth-selenide magnetometer over standard magnetometers are stressed. Thermal stability of bismuth-selenide magnetometer is analyzed. Linearity of output versus magnetic field over wide range of temperatures is reported.

**B72-10654  
PREVENTION OF CATHODE DAMAGE FROM POSITIVE ION BOMBARDMENT**

W. H. Bennett (N. C. State Univ.)

Dec. 1972

**HQ-10688**

Mixed alkaline earth oxide compounds deposited into hole at cathode surface center prevent ion back bombardment damage, to cathode by reducing oxide layer and by creating metallic diffusion along sides of hole for enhanced electron emission.

**B72-10655  
A BI-STABLE OPTICAL DEVICE**

A. Szoke (MIT)

Dec. 1972

**HQ-10701**

Device was developed which produces short optical pulses of variable lengths with high peak power and without use of external modulators or independent light beams. Optical field intensity is built up inside cavity. At peak of its intensity, light is switched off.

**B72-10662  
A STUDY OF RADIATION ENVIRONMENT IN SPACE AND ITS BIOLOGICAL EFFECTS**

S. B. Curtis (Boeing Co.) and M. C. Wilkinson (Boeing Co.)

Dec. 1972 See also D2-84274-1; D2-90469; NASA-CR-1037; NASA-CR-1469

**HQ-10798**

Biological effects on man in space resulting from galactic and solar cosmic radiation are discussed. Importance of secondary ions which contribute to galactic cosmic radiation hazards is analyzed. Mathematical model to show rate of production of secondary ions of given atomic number at various points in absorber is presented.

**B72-10665  
SELF-CALIBRATING REMOTE ATMOSPHERIC ELECTRO-MAGNETIC PROBE AND DATA ACQUISITION SYSTEM**

K. A. Kadrmas

Oct. 1972

**M-FS-21212**

Design and development of electromagnetic probe is discussed. Probe is designed to measure wind speed, turbulence levels, and aerosol content of atmosphere. Data are used to construct real-time, three dimensional map of atmospheric composition.

**B72-10670  
A METHOD OF ELIMINATING HYDROGEN MASER WALL SHIFT**

M. W. Levine (Smithsonian Astrophys. Obs.) and R. F. C. Vessot (Smithsonian Astrophys. Obs.)

Dec. 1972

**HQ-10663**

Maser output frequency shift was prevented by storage bulb kept at temperature at which wall shift is zero and effects of bulb size, shape, and surface texture are eliminated. Servo system is shown, along with bidirectional counter.

**B72-10699  
ACCURATE MEASUREMENT OF GAS VOLUMES BY LIQUID DISPLACEMENT**

J. D. Christian

Dec. 1972

**ARC-10723**

Mariotte bottle as liquid displacement device was used to measure gas volumes at flow rates that are far below threshold of wet test gas meters. Study of factors affecting amount of liquid displaced by gas flow was completed, and equations were derived which relate different variables.

**B72-10700  
PARALLEL-PLATE VISCOMETER**

H. T. Fearnough, R. F. Fedors, R. F. Landel, and T. H. Sauer

Dec. 1972

**NPO-11387**

Viscometer consists of movable vertical rod with one optical flat fixed to its lower end and centered over second optical flat held rigidly parallel to moveable flat. Two perforated diaphragms of thin metal permit limited amount of vertical movement of rod carrying movable flat, but resist lateral movement.

**B72-10701  
THIN-FILM ULTRAVIOLET DETECTOR AND SPECTROMETER**

G. W. Lewicki and J. Maserjian

Dec. 1972

**NPO-11432**

Typical metal-insulator-metal detector device is formed on quartz substrate. Base electrode is 3 to 6 nm aluminum layer, overcoated with 3 to 6 nm aluminum oxide or aluminum nitride, and capped with counter electrode of gold, lead, magnesium, or aluminum. Photoelectric yield data are given for Al-AlN-Au structure.

**B72-10702  
COMPARATIVE PERFORMANCE OF DOUBLE-FOCUS AND QUADRUPOLE MASS SPECTROMETERS**

S. K. Wilson

Dec. 1972 See also JPL-TM-33-456

**NPO-11689**

## 03 PHYSICAL SCIENCES

Light-weight flight type double focus and quadruple mass spectrometer models were compared. Data cover size, weight, and power sensitivity required to achieve same resolution sensitivity at given mass number. Comparison was made using mathematical relationships. Analysis was confined to equal ion source area sensitivity variations not more than 40% over mass range.

### B72-10703 GAS-FLOW RESTRICTOR

G. J. Bastien  
Dec. 1972  
NPO-10117

Gas flow restrictor is described, consisting of predetermined length and size of capillary tubing to control flow rate of carrier gas into gas chromatograph of flow rate of sample gas into mass spectrometer inlet system. Length and inner diameter of capillary tubing was estimated with mathematical expressions for viscous flow.

### B72-10706 TRANSONIC DIVIDER FOR GAS CHROMATOGRAPH EFFLUENTS

J. B. Wellman  
Dec. 1972  
NPO-11479

Transonic effluent divider system was developed which permits varying mass input of gas chromatographic effluent into mass spectrometer without affecting performance of gas chromatograph. Mechanisms of operation are described.

### B72-10707 COMPUTATION OF LAMINAR HEAT TRANSFER FROM GASEOUS PLASMAS IN ELECTROMAGNETIC FIELDS

T. K. Bose  
Dec. 1972 See also JPL-TR-32-1447  
NPO-11725

Heat transfer analysis procedure is presented for two-temperature gaseous plasma. Analysis is based on laminar flow of singly-ionized, quasineutral plasma with variable properties. Sheath analysis is described for species in accelerating field, decelerating field, emitted from wall, and recombining at wall.

### B72-10720 ERASABLE HOLOGRAPHIC MEDIUM USING CIS-TRANSISOMERIZATION

A. H. Adelman (Battelle-Columbus Lab.) and H. M. Grotta (Battelle-Columbus Lab.)  
Dec. 1972  
M-FS-22062

Photochemical process has been developed for recording of erasable holograms by utilizing reversible transformation of two isomers of molecule upon exposure to light. Hologram system records, reads, and erases in response to changes in refractive index of mixture of isomers.

### B72-10727 TECHNIQUE FOR REFOCUSING, DECOMPRESSING, AND CONDITIONING SPENT ELECTRON BEAMS

H. G. Kosmahl  
Dec. 1972 See also NASA-CR-121026; NASA-TN-D-6093  
LEWIS-11617

System to improve space communication by refocusing spent electron beams is described. System reduces transverse velocity components in beam and dilutes current densities to acceptable levels. Diagram of principles of operation is included.

## 04 MATERIALS/CHEMISTRY

### B72-10002 SMALL-SCALE EXPLOSIVE WELDING OF ALUMINUM

L. J. Bement  
1972

#### LANGLEY-10941

Welding technique uses very small quantities of explosive ribbon to accomplish small-scale lap-welding of aluminum plates. Technique can perform small controlled welding with no length limitations and requires minimal protective shielding.

### B72-10005 FLAME RESISTANT ELASTIC ELASTOMERIC FIBERS

J. T. Howarth (Little /Arthur D./, Inc.) and A. A. Massucco (Little /Arthur D./, Inc.)  
Sep. 1972 See also NASA-CR-115227  
MSC-13923-4

Development of materials to improve flame resistance of elastic elastomeric fibers is discussed. Two approaches, synthesis of polyether based urethanes and modification of synthesized urethanes with flame retardant additives, are described. Specific applications of both techniques are presented.

### B72-10019 EXPERIMENTAL STUDY OF SURFACE CRACKS

Innovator not given (Southwest Res. Inst.) 1972 See also NASA-CR-114934  
MSC-14032

Analysis of plastic zones surrounding surface cracks in stressed steel and titanium plates subjected to tensile loading shows that back surface dimpling develops at stress levels considerably lower than those predicted by theoretical models of yield zone penetration into back surface.

### B72-10027 IMPROVED ELASTOMER FOR USE WITH OXYGEN DIFLUORIDE

J. W. Martin (TRW Systems Group) and J. L. Bell (TRW Systems Group)  
1972 See also NASA-CR-115902  
ARC-10528

Method improves resistance of CIS-1,4-poly(butadiene) elastomers to attack by oxygen difluoride at low temperatures by replacing silica reinforcement with less reactive substances. Improved elastomeric compound is utilized in bladders, diaphragms, valves, O-rings and seals.

### B72-10028 SPECIMEN FOR HIGH-TEMPERATURE TENSILE TESTS

C. D. Coulbert (Marquardt Co.)  
1972

#### ARC-10531

Split nut with internal taper to hold specially formed specimen composed of filaments of refractory material provides means for holding at high temperature and under tension so that performance evaluations may be made.

### B72-10029 ISOTROPIC PYROLYTIC CARBONS

H. Shimizu (Marquardt Co.)  
1972

#### ARC-10532

Depositing carbon on high-temperature substrate that is kept in motion by vibration produces isotropic pyrolytic graphite or carbon without using fluidized beds.

### B72-10038 USE OF THIN PLASTIC FILMS AT CRYOGENIC TEMPERATURES

R. F. Lark, J. T. Hoggatt (Boeing Co.), K. E. Wiedekamp (Boeing Co.), and J. G. Shdo (Boeing Co.)  
1972 See also NASA-CR-54433; NASA-CR-72115; NASA-CR-72134; NASA-CR-72418; NASA-CR-72432; NASA-CR-72502; NASA-TM-X-1555  
LEWIS-11047

Commercially available plastic film materials that remain flexible at cryogenic temperatures and resist failures caused by folds and wrinkles created during expulsion were investigated for use in expulsion bladders for liquefied gases. Compatible

adhesive systems, fabrication techniques, and results of impact and dynamic loading tests are summarized.

**B72-10044**  
**A METHOD OF ISOLATING ORGANIC COMPOUNDS PRESENT IN WATER**

G. V. Calder, J. Fritz, and G. A. Junk  
 1972

**AEC-10010**

Water sample is passed through a column containing macrorotular resin, which absorbs only nonionic organic compounds. These compounds are selectively separated using aqueous eluents of varying pH, or completely exuded with small amount of an organic eluent.

**B72-10063**  
**OPTICAL BONDING AGENTS FOR SEVERE ENVIRONMENTS**

S. F. Pellicori (Santa Barbara Res. Center)  
 1972

**ARC-10459**

Test results and applications of elastors (General Electric RTV 665, Dow Corning (DC) XR-63-488, DC 93-500, DC 182, and DC 184) considered for use as optical bonding agents in aerospace environments are presented.

**B72-10090**  
**SHEET PLASTIC FILTERS FOR SOLAR CELLS**

R. J. Wizenick (Electro-Opt. Systems)  
 1972

**NPO-11464**

Poly(vinylidene fluoride) (PVF) film protects solar cells on Mars surface from radiation and prevents degradation of solar cell surfaces by Martian dust storms. PVF films may replace glass or quartz windows on solar cell arrays used to generate power on earth.

**B72-10115**  
**PROMOTION OF DROPWISE CONDENSATION OF ETHYL ALCOHOL, METHYL ALCOHOL, AND ACETONE BY POLYTETRAFLUOROETHYLENE**

C. E. Kirby  
 1972

**LANGLEY-10940**

Coating condensing surfaces with thin layer of nonpolar Teflon results in dropwise condensation of polar organic vapor. Greater heat transfer coefficients are produced increasing effectiveness of condensing system. Investigation shows that vapors with strong dipole moment tend to condense dropwise.

**B72-10129**  
**PREVENTING OIL MIGRATION IN VACUUM SYSTEMS**

M. Cridlin  
 May 1972

**GSFC-11253**

Method which uses a disposable metal gasket that is removed when system is deactivated eliminates oil migration from mechanical pump to other areas of the system.

**B72-10136**  
**LUBRICANT SELECTION FOR GEAR DESIGNERS**

D. P. Townsend  
 1972 See also NASA-TM-X-52942

**LEWIS-11483**

Guide for gear designers, consisting of theory, calculations, charts, curves and references, explains lubrication requirements for gears to insure maximum performance. Mechanical and service variables are considered in order to obtain optimum gear performance under severe operating conditions.

**B72-10137**  
**CARBON MONOXIDE OXIDATION RATES COMPUTED FOR AUTOMOBILE THERMAL REACTOR CONDITIONS**

R. S. Brokaw and D. A. Bittker  
 May 1972 See also NASA-TN-D-7024

**LEWIS-11638**

Carbon monoxide oxidation rates in thermal reactors for exhaust manifolds are computed by integrating differential equations for system of twenty-nine reversible chemical reactions. Reactors are noncatalytic replacements for conventional exhaust manifolds and are a system for reducing carbon monoxide and hydrocarbons in automobile exhausts.

**B72-10144**  
**AN EMPIRICAL RELATIONSHIP FOR THE PENETRATION OF 1 TO 3 MeV ELECTRONS**

F. R. Stevenson  
 May 1972

**LEWIS-11495**

Empirical correlation of high energy electrons into materials allows predictions of practical ranges (measure of electron penetration) for different elements and alloys.

**B72-10150**  
**ADVANCED PROTECTIVE COATING FOR SUPERALLOYS**

R. C. Elam (Pratt and Whitney), F. P. Talboom (Pratt and Whitney), and L. W. Wilson (Pratt and Whitney)  
 Dec. 1972 See also NASA-CR-72813

**LEWIS-11473**

Superior oxidation protection for nickel-base alloys at temperatures up to 1367 K was obtained with cobalt-base alloy coating. Coating had 25 Cr, 14 Al, and 0.5 Y weight percent composition. Coating was applied by electron beam vapor deposition to thickness of 76 to 127 microns.

**B72-10157**  
**NONDESTRUCTIVE TEST STANDARDS FOR EVALUATION OF FIBER-REINFORCED COMPOSITES**

W. M. Pless (Lockheed-Ga. Co.), B. L. Weil (Lockheed-Ga. Co.), W. H. Lewis (Lockheed-Ga. Co.), and G. W. Burton (Lockheed-Ga. Co.)

May 1972

**M-FS-21288**

Advanced composite standards, representing potential variations occurring when composites are processed into finished structures, were designed, fabricated and tested. Testing methods utilized were ultrasonic C-scan, radiography, and infrared.

**B72-10161**  
**HALOGENATION OF MICROCAPSULE WALLS**

T. R. Davis (Natl. Cash Register Co.), C. K. Schaab (Natl. Cash Register Co.), and J. C. Scott (Natl. Cash Register Co.)  
 1972

**ARC-10410**

Procedure for halogenation of confining walls of both gelatin and gelatin-phenolic resin capsules is similar to that used for microencapsulation. Ten percent halogen content renders capsule wall nonburning; any higher content enhances flame-retardant properties of selected internal phase material. Halogenation decreases permeability of wall material to encapsulated materials.

**B72-10172**  
**IMPROVED SYNTHESIS OF INTERMETAL COMPOUNDS**

J. S. Haggerty (Little / Arthur D., Inc.) and J. Wenckus (Little / Arthur D., Inc.)  
 May 1972

**HQ-10690**

Method in crystal growth using liquid encapsulation techniques permits GaAs synthesis of materials from constituent elements whose vapor pressures are high at temperature at which they react spontaneously. Techniques may be useful for synthesis of GaP.

**B72-10175**  
**NEW POLYIMIDE POLYMER HAS EXCELLENT PROCESSING CHARACTERISTICS WITH IMPROVED THERMO-OXIDATIVE AND HYDROLYTIC STABILITIES**

R. J. Jones (TRW, Inc.), R. W. Vaughan (TRW, Inc.), and W. P. Kendrick (TRW, Inc.)

May 1972 See also B69-10118; B70-10300; B70-10330;

**NASA-CR-72633**

**LEWIS-11323**

#### 04 MATERIALS/CHEMISTRY

Polyimide P10P and its processing technique apply to most high temperature plastic products, devices and castings. Prepolymer, when used as varnish, impregnates fibers directly and is able to be processed into advanced composites. Material may also be used as molding powder and adhesive.

**B72-10187**

##### **SUPERIOR CRYOGENIC INSULATION DEVELOPED**

D. V. Hale (Lockheed Missiles and Space Co.), M. J. O'Neill (Lockheed Missiles and Space Co.), and A. J. McDaniel (Lockheed Missiles and Space Co.)

May 1972

**M-FS-21560**

Multilayer composite consisting of alternate spunbond nylon layers and doubly aluminized mylar layers is used primarily in cryogenic thermal protection systems.

**B72-10199**

##### **HIGH-TEMPERATURE CERAMIC-TO-CERAMIC SEALS**

W. Smart (Appl. Electrochem., Inc.)

May 1972 See also NASA-CR-73464

**ARC-10319**

Noble-metal brazes applied to appropriately prepared zirconia parts produces a gas-tight, durable seal that can withstand temperature of 825 C for over 2000 hours without deterioration.

**B72-10201**

##### **COMPARISON OF CATALYST ACTIVITY**

T. J. Jennings (Shell Develop. Co.) and H. H. Voge (Shell Develop. Co.)

May 1972

**ARC-10493**

Reactions of highly active catalysts are compared by allowing temperature of catalyst bed, initially at 77 K, to increase slowly; marked deviation in smooth warming curve denotes temperature at which detectable reaction occurs. The lower the temperature at which reaction commences, the more active the catalyst.

**B72-10215**

##### **CONVOLUTED FABRIC FOR FULL-PRESSURE GLOVES**

W. Elkins (Space Age Control, Inc.), C. Breslin (Space Age Control, Inc.), and H. Price (Space Age Control, Inc.)

May 1972 See also NASA-CR-114365

**ARC-10529**

Fabric, made of nylon ripstop coated with Neoprene, provides expansive and contractive mobility along posterior surface of glove fingers allowing maximum digital dexterity and tactility.

**B72-10223**

##### **INITIATION OF POLYMERIZATION BY TETRABUTYLAMMONIUM p-LITHIOPHENOXIDE**

S. M. Hirshfield (Rocketdyne)

1972 See also B72-10184

**ARC-10553**

Compound is an efficient initiator capable of producing a polymer with a phenol group at the initiating end of the chain. Derivative may be used as a polymerization initiator to produce large quantities of phenol-terminated polymers.

**B72-10230**

##### **WATER PURIFICATION BY REVERSE OSMOSIS USING HETEROCYCLIC POLYMER MEMBRANES**

H. Scott (Franklin Inst. Res. Labs.)

May 1972 See also NASA-CR-1648

**LANGLEY-10514**

Pyrrone (polyimidazopyrrolone) polymers are a new class of thermally stable, radiation and chemical resistant aromatic-heterocyclic polymers featuring a greater chemical and mechanical durability than cellulose acetate.

**B72-10231**

##### **ADHESION THEORY REVIEW**

N. J. DeLollis

May 1972 See also SC-RR-70-915

**AEC-10083**

Bonding theories reviewed include physical adsorption,

hydrogen bonding, chemisorption and surface energy; bond failure mechanisms include phase discontinuity, swelling and corrosion. Concept of bond failure by water desorption is introduced and discussed.

**B72-10234**

##### **IMPROVED METHOD FOR PRODUCING METAL-REINFORCED CERAMICS**

R. L. Landingham

May 1972

**AEC-10070**

Vacuum impregnation process produces metal-reinforced ceramics with only 3 percent void space volumes. Method may be used to produce metal-reinforced ceramics for high temperature or structural applications such as furnace supports and armor.

**B72-10235**

##### **HIGH STRENGTH, MEDIUM DENSITY MOLDED FOAM**

J. R. Fender (Bendix Corp.)

May 1972

**AEC-10053**

Toluene diisocyanate-based polyurethane produces molded-to-size foam products. Formulation techniques optimize dimension stability, strength and moldability.

**B72-10247**

##### **INSOLUBILIZED ENZYMES FOR FOOD SYNTHESIS**

D. L. Marshall (Battelle Mem. Inst.)

Sep. 1972

**ARC-10568**

Cellulose matrix with numerous enzyme-coated silica particles of colloidal size permanently bound at various sites within matrix was produced that has high activity and possesses requisite physical characteristics for filtration or column operations. Product also allows coupling step in synthesis of edible food to proceed under mild conditions.

**B72-10249**

##### **OXYGEN CARRIER FOR GAS CHROMATOGRAPHIC ANALYSIS OF INERT GASES IN PROPELLANTS**

W. A. Cannon (McDonnell-Douglas Corp.)

Sep. 1972 See also NASA-CR-97860

**ARC-10574**

Gas chromatographic determination of small quantities of inert gases in reactive propellants is discussed. Operating conditions used for specific analyses of helium in diborane and nitrogen in oxygen difluoride are presented in tabular form.

**B72-10256**

##### **A PROTECTIVE COATING FOR STAINLESS STEEL**

S. J. Grisaffe and E. W. Klechka

May 1972 See also NASA-TM-X-2201

**LEWIS-11267**

Comparative furnace oxidation tests prove that coating provides high temperature oxidation and erosion resistance.

**B72-10257**

##### **POLYMERIC COATINGS USING ELECTRONIC EXCITATION**

S. M. Lee (N. Am. Rockwell Corp.)

Jun. 1972

**HQ-10698**

Process has been developed for glow discharge polymerization which is accomplished in inert atmosphere by using vacuum chamber. Polymeric coating, in this type of environment, produces high molecular weight coating polymers that have good stability and are resistant to abrasions and solvents.

**B72-10262**

##### **DEVELOPMENT OF A POLYIMIDE FOR USE AS A TEMPERATURE AND SOLVENT RESISTANT SEALANT**

J. S. Roscoe (Quantum, Inc.) and B. F. Clark (Quantum, Inc.)

Jul. 1972

**M-FS-21325**

Polyimide developed by the interaction of benzophenone tetracarboxylic dianhydride, polyoxypropylene diamine, and

oxydianiline is used for fuel tanks that are exposed to extreme temperatures.

**B72-10266**

**COMPOSITE CASTING DEMONSTRATION**

Innovator not given (Little /Arthur D./, Inc.) Jun. 1972

**M-FS-21668**

Demonstration was performed to experimentally assess the potential advantages in the processing of materials in space, and specifically, to determine the effects of lack of density segregation and heat convection in the weightless environment of space.

**B72-10269**

**FIRE RETARDANT POLYISOCYANURATE FOAM**

S. R. Riccitiello and J. A. Parker

1972

**ARC-10280**

Fire retardant properties of low density polymer foam are increased. Foam has pendant nitrile groups which form thermally-stable heterocyclic structures at temperature below degradation temperature of urethane linkages.

**B72-10280**

**DEVOLATILIZATION OF POLYMER RESINS**

B. Seidenberg, J. Park, and C. Clatterbuck

Jun. 1972

**GSFC-11358**

Commercial silicon resin was devolatilized by vacuum distillation, cured at room temperature and tested favorably for outgassing criteria. Applications of the devolatilized resin are potting compounds and conformal coatings.

**B72-10282**

**NEW TWISTED INTERMETALLIC COMPOUND SUPERCONDUCTOR: A CONCEPT**

W. D. Coles, G. V. Brown, and J. C. Laurence

Jun. 1972

**LEWIS-11015**

Method for processing Nb<sub>3</sub>Sn and other intermetallic compound superconductors produces a twisted, stabilized wire or tube which can be used to wind electromagnetics, armatures, rotors, and field windings for motors and generators as well as other magnetic devices.

**B72-10284**

**A NEW VIBRATION DAMPENING ADHESIVE**

S. Y. Yoshino (N. Am. Rockwell Corp.)

Jul. 1972

**MSC-17668**

Formulation of polymers has been devised that, when vibrated, adhesive becomes more fluid (thixotropic) to better absorb shock and, when warmed, will actually hold its shape better (thermosetting) rather than deform.

**B72-10290**

**HIGH VOLTAGE ELECTRICAL INSULATION COATING FOR REFRACTORY MATERIALS**

W. E. Lent (Hughes Aircraft Co.)

Jun. 1972 See also NASA-CR-72677

**LEWIS-11479**

Formula and process have been developed for coating refractory metal surfaces with high voltage electrical insulation for use at temperatures to 600 C. Coatings were specifically developed as an insulation for the surface of a perforated, molybdenum, ion-accelerator grid, but are not limited to this application.

**B72-10291**

**IMPROVED THERMALLY CONDUCTING ELECTRON TRANSFER POLYMERS**

R. K. Jenkins (McDonnell-Douglas Corp.), N. R. Byrd (McDonnell-Douglas Corp.), and J. L. Lister (McDonnell-Douglas Corp.)

Jun. 1972

**GSFC-11304**

Development of polymers with improved heat transfer

coefficients for use in encapsulating electronic modules is discussed. Chemical reactions for synthesizing the polymers are described and thermodynamic and physical properties are analyzed.

**B72-10294**

**GRAPHITE AND BORON-REINFORCED COMPOSITE MATERIALS DATA SUMMARY**

Innovator not given (Gen. Dyn. Corp.) Jun. 1972

**M-FS-21691**

Data summary is collection of information on typical processing techniques. Mechanical properties, and physical properties of advanced composite materials which are being considered for structural applications on advanced space vehicles.

**B72-10300**

**POLYIMIDE FOAMS PROVIDE THERMAL INSULATION AND FIRE PROTECTION**

R. W. Rosser

Sep. 1972

**ARC-10464**

Chemical reactions to produce polyimide foams for application as thermal insulation and fire prevention materials are discussed. Thermal and physical properties of the polyimides are described. Methods for improving basic formulations to produce desired qualities are included.

**B72-10305**

**CATALYST FOR SODIUM CHLORATE DECOMPOSITION**

T. J. Wydeven

Sep. 1972

**ARC-10584**

Production of oxygen by rapid decomposition of cobalt oxide and sodium chlorate mixture is discussed. Cobalt oxide serves as catalyst to accelerate reaction. Temperature conditions and chemical processes involved are described.

**B72-10306**

**MICROMINIATURE GAS CHROMATOGRAPHIC COLUMN**

R. W. Donaldson, Jr.

Sep. 1972

**ARC-10594**

Techniques commonly used for fabrication of integrated circuits are utilized to produce long capillary tubes for microminiature chromatographs. Method involves bonding of flat silicon plate to top of spirally grooved silicon chip to close groove and form capillary column.

**B72-10309**

**STABILIZATION OF POROUS GLASS REVERSE-OSMOSIS MEMBRANES**

E. V. Ballou, M. I. Leban, and T. Wydeven

Sep. 1972

**ARC-10646**

Application of porous glass in form of capillary tubes for low capacity ion exchange in hyperfiltration experiments is discussed. Efficiency of desalination by process of reverse osmosis is described. Stabilization of porous glass membrane by presence of aluminum chloride is analyzed.

**B72-10313**

**INORGANIC GLASS CERAMIC SLIP RINGS**

E. W. Glossbrenner (Litton Precision Products, Inc.) and S. R. Cole (Litton Precision Products, Inc.)

Jun. 1972

**M-FS-20711**

Prototypes of slip rings have been fabricated from ceramic glass, a material which is highly resistant to deterioration due to high temperature. Slip ring assemblies were not structurally damaged by mechanical tests and performed satisfactorily for 200 hours.

**B72-10318**

**MAGNETIC-DOPED ALLOYS WITH VERY LARGE SEEBECK COEFFICIENTS**

D. J. Sellmeyer (MIT) and J. Zagarins (MIT)

Jul. 1972



#### 04 MATERIALS/CHEMISTRY

##### M-FS-21410

Preliminary results of this study show that, based on selection of magnetic solute and nonmagnetic solvent from periodic table, alloys having Seebeck coefficients approaching 100 micron V/K can be obtained.

##### B72-10320

#### PLASMA CALCINING OF PIGMENT PARTICLES FOR THERMAL CONTROL COATINGS

E. P. Farley (Stanford Res. Inst.)

Jul. 1972

##### M-FS-21267

Method utilizes an RF excited plasma to surface deactivate thermally stable powders at high temperatures. Utilization of this plasma heat treatment at high temperatures can be carried out without grain growth, calcination, or agglomeration.

##### B72-10321

#### TITANIUM ALLOY STRESS CORROSION CRACKING IN PRESENCE OF DINITROGEN TETROXIDE

A. Z. Conner (Hercules, Inc.), J. F. G. Clarke, Jr. (Hercules, Inc.), J. A. Gailey (Hercules, Inc.), and A. A. Orr (Hercules, Inc.)

Jul. 1972

##### M-FS-21113

Study resulting in a satisfactory stress corrosion cracking test with extremely consistent results produced six new analytical methods. Methods detect and determine differences in the minor constituent composition of different types of dinitrogen tetroxide.

##### B72-10328

#### TRACE CONTAMINANT ADSORPTION AND SORBENT REGENERATION IN CLOSED ECOLOGICAL SYSTEMS

C. R. Arnold (Lockheed Missiles and Space Co.), G. J. Kersels (Lockheed Missiles and Space Co.), R. P. Merrill (Lockheed Missiles and Space Co.), A. J. Robell (Lockheed Missiles and Space Co.), and A. Wheeler (Lockheed Missiles and Space Co.)

Dec. 1972 See also NASA-CR-1582

##### LANGLEY-10681

Correlation was obtained for determining sorptive capacity of carbon for pure and mixed contaminants under dry and humid conditions at various temperatures. Vacuum desorption rates were investigated for single particles and for sorbent beds. For sorbent beds, rate-determining step is Knudsen diffusion through interparticle voids.

##### B72-10333

#### ANALYSIS OF THERMAL STRESS AND METAL MOVEMENT DURING WELDING

J. B. Andrews (MIT) and K. Masubuchi (MIT)

Jul. 1972

##### M-FS-20984

Objectives of study were: investigation of temperature changes caused by welding arc with analysis of temperature distribution; development of system of mathematical statements describing thermal stresses and plastic strains during welding; and development of system of mathematical solutions and computer programs for one-dimensional analysis.

##### B72-10336

#### STUDY OF IN-SITU DEGRADATION OF THERMAL CONTROL SURFACES

J. E. Gilligan (IIT Res. Inst.) and G. A. Zerlaut (IIT Res. Inst.)

Jul. 1972

##### M-FS-20892

Experimental technique used in study of damage mechanism to semiconductor pigments exposed to ultraviolet radiation can be adapted for investigations of surface chemistry and may be used analytically to determine contamination.

##### B72-10337

#### NONFLAMMABLE POTTING, ENCAPSULATING AND/OR CONFORMAL COATING COMPOUND

H. F. Kline and F. Dawn

Jul. 1972

##### MSC-13499

Compound formed from dimethylpolysiloxane, ammonium

phosphate, and ground glass is nonflammable in air environment, and self-extinguishing in atmosphere of 60 percent oxygen and 40 percent nitrogen. Material may have applications for reducing industrial fire hazards and should interest aircraft industry, machinery manufacturers, and automotive industry.

##### B72-10339

#### STRAIN GAGE ATTACHMENT BY SPOT WELDING REDUCES THE FATIGUE STRENGTH OF Ti-6Al-4V, RENE 41, AND INCONEL X

L. A. Imig

Jul. 1972

##### LANGLEY-10930

Fatigue tests were conducted with constant-amplitude axial stresses in the ratio of minimum to maximum stress of 0.05 (R=0.05). Specimens with and without strain gages were tested at 21 C, and superalloy specimens with and without strain gages were tested at 21 C and 815 C.

##### B72-10340

#### FABRICATION OF UNIAXIAL FILAMENT-REINFORCED EPOXY TUBES FOR STRUCTURAL APPLICATION

J. G. Davis, Jr.

Jul. 1972

##### LANGLEY-10203

Filament reinforced composite materials have high strength, high stiffness and low density. Tubes fabricated from process described have advantages of having smooth inner and outer surfaces, lower dimensional variation than tolerances set for extruded aluminum tubing and void free composites.

##### B72-10342

#### SYNTHESIS OF TEMPERATURE AND SOLVENT-RESISTANT POLYMERS

J. A. Webster (Monsanto Res. Corp.), W. J. Patterson, R. L. Moffett, and D. E. Morris

Jul. 1972

##### M-FS-20848; M-FS-20979; M-FS-21039

Development of silicone polymers, polyimides, and polyisocyanurates for use as insulation, coatings, or adhesives under adverse environmental conditions is discussed. Chemical structure of the organic compounds is presented. Physical and mechanical properties of the compounds are analyzed.

##### B72-10343

#### A PERMEABLE ROTATING-WHEEL SOLVENT EXTRACTOR

D. R. Kahn and L. A. Nady

Dec. 1972

##### LRL-10033

Column-type device reported employs circular permeable structures of wire mesh screen for extracting solvents from systems with low density differences and low interfacial tensions. Rotating screen wheels of structure fasten to shaft; stationary screen structures are supported by circular bands connected by radial metal arms.

##### B72-10344

#### HIGH STRENGTH ALLOY FOR IMMEDIATE TEMPERATURE, 24 TO 704 C (75 TO 1300 F), APPLICATIONS

J. C. Freche, R. L. Ashbrook, and W. J. Waters

Jul. 1972 See also NASA-TN-D-6560

##### LEWIS-11634

Application of prealloyed powder technology to the NASA-TRW-VI-A alloy shows the potential of highly alloyed normally cast superalloys for achieving superior properties at intermediate temperatures.

##### B72-10346

#### ADHESIVE FOR ALUMINUM WITHSTANDS CRYOGENIC TEMPERATURES

W. L. Hill (N. Am. Rockwell Corp.), T. Matsuoka (Hj Am. Rockwell Corp.), and J. C. Helf (N. Am. Rockwell Corp.)

Jul. 1972

##### M-FS-16848

Polyurethane adhesive mixed to various proportions with

milled glass fibers match the thermal characteristics of 2014-T6 aluminum at cryogenic temperatures.

**B72-10353**

**TITANIUM REINFORCED BORON POLYIMIDE COMPOSITE**

G. A. Clark (N. Am. Rockwell Corp.)

Jul. 1972

**M-FS-21916**

Program involves development of process technique for boron-polyimide prepreg, lay-up and curing procedures for prepreps when processed under vacuum bag pressure, and development and evaluation of titanium hard points for smooth transition of loads from titanium attach points into boron reinforced body of structure.

**B72-10358**

**THERMALLY RESISTANT POLYMERS FOR FUEL TANK SEALANTS**

J. A. Webster (Monsanto Res. Corp.)

Jul. 1972

**M-FS-21232**

Conversion of fluorocarbon dicarboxylic acid to intermediates whose terminal functional groups permit polymerization is discussed. Resulting polymers are used as fuel tank sealers for jet fuels at elevated temperatures. Stability and fuel resistance of the prototype polymers is explained.

**B72-10364**

**FAILURE IN GLASS**

S. C. Keeton

Jun. 1972 See also SCL-RR-710010

**AEC-10088**

Review of state of the art concerning glass failure mechanisms and fatigue theories discusses brittle fracture in glass, fatigue mechanisms, fatigue behavior, environmental effects on failure rate, and aging.

**B72-10365**

**EVALUATING FOAM HETEROGENEITY**

D. W. Liou (Dow Chem. Co.) and W. M. Lee (Dow Chem. Co.)

Jun. 1972 See also BDX-613-229

**AEC-10046**

New analytical tool is available to calculate the degree of foam heterogeneity based on the measurement of gas diffusivity values. Diffusion characteristics of plastic foam are described by a system of differential equations based on conventional diffusion theory. This approach saves research and computation time in studying mass or heat diffusion problems.

**B72-10366**

**POLYMERIC BINDER FOR EXPLOSIVES**

E. R. Bissell

Jun. 1972

**AEC-10062**

Chemical reaction for producing a polymer which can be mixed with explosives to produce a rigid material is discussed. Physical and chemical properties of polymers are described and chemical structure of the polymer is illustrated.

**B72-10367**

**BONDABILITY OF RTV-SILICON RUBBER**

N. J. Delollis and O. Montoya

Jun. 1972

**AEC-10026**

Glow discharge method for producing a bondable Room Temperature Vulcanizing (RTV) silicone is described. Mechanical and chemical properties of silicone specimens are described. Theory concerning the relationship between surface characteristics and bondability is examined with respect to the polymer specimen.

**B72-10378**

**DISPERSION-STRENGTHENED CHROMIUM ALLOY**

J. M. Blocker, Jr. (Battelle Mem. Inst.) and N. D. Veigel (Battelle Mem. Inst.)

Dec. 1972 See also NASA-CR-72404; NASA-CR-72901

**LEWIS-10982**

Finely divided powder mixture produced by vapor deposition of CR on small ThO<sub>2</sub> particles was hot pressed or pressure bonded. Resulting alloy has lower ductile-to-brittle transition temperature than pure chromium, and high strength and oxidation resistance at elevated temperatures, both in as-rolled condition and after annealing.

**B72-10382**

**COMMON BEARING MATERIAL HAS HIGHEST FATIGUE LIFE AT MODERATE TEMPERATURE**

R. J. Parker, E. V. Zaretsky, and M. W. Dietrich

Jul. 1972 See also NASA-TN-D-6179; NASA-TN-D-7033

**LEWIS-11692**

AISI 52100, a high carbon chromium steel, has the longest fatigue life of eight bearing materials tested. Fatigue lives of the other materials ranged from 7 to 78 percent of the fatigue life of AISI 52100 at a temperature of 340 K (150 F).

**B72-10386**

**BORON ALUMINUM COMPOSITE STRUCTURES**

R. E. Jackson (McDonnell-Douglas Corp.)

Jul. 1972

**M-FS-21571**

Design, analysis and fabrication techniques have been developed for boron-aluminum composite structure technology and were compared with those of conventional metal structure technology to evaluate relative performance.

**B72-10396**

**METHOD TO DETERMINE VENTED ELECTROCHEMICAL CELL QUALITY**

J. T. Stemmler

Jul. 1972

**GSFC-11216**

Cell mass is measured periodically or monitored continuously by balances and clocks to determine water loss and rate of mass loss during trickle charge period.

**B72-10397**

**ION PLATING SEALS MICROCRACKS OR POROUS METAL COMPONENTS**

T. Spalvins, D. H. Buckley, and W. A. Brainard

Jul. 1972 See also B67-10006

**LEWIS-11657**

Description of ion plating process is given. Advantage of this process is that any plating metal or alloy can be selected, whereas, for conventional welding, material selection is limited by compatibility.

**B72-10401**

**DEFLECTION RESISTANCE INDICATOR**

H. S. Massey (N. Am. Rockwell Corp.), H. L. Pontious (N. Am. Rockwell Corp.), and W. M. Zinsley (N. Am. Rockwell Corp.)

Dec. 1972

**M-FS-24010**

Instrument for nondestructively measuring compression resistance of spray foam used as thermal insulation was developed. Cylindrical indicator has probe with coil spring to provide force and indicating dial. Probe is manually pressed against area to be tested until complete foot area contacts foam surfaces.

**B72-10406**

**INSULATING EFFECTIVENESS OF SELF-SPACING DIMPLED FOIL**

J. A. Bond (GE)

Dec. 1972

**LEWIS-10941**

Experimental data are graphed for determining conductive heat losses of multilayer insulation as function of number of foil layers. Foil was 0.0051 cm thick Nb, 1% Zr refractory alloy, dimpled to 0.0254 cm with approximately 28 dimples/sq cm. Heat losses were determined at 0.1 microtorr between 700 and 1089 K.

**B72-10412**

**PURIFICATION OF CONTAMINATED WATER BY FILTRA-**

**TION THROUGH POROUS GLASS**

T. Wydeven and M. I. Leban

Sep. 1972

**ARC-10655**

Method for purifying water that is contaminated with mineral salts and soluble organic compounds is described. Method consists of high pressure filtration of contaminated water through stabilized porous glass membranes. Procedure for conducting filtration is described. Types of materials by percentage amounts removed from the water are identified.

**B72-10413****RAPID EVALUATION OF REVERSE-OSMOSIS MEMBRANES**

J. R. Hollahan and T. Wydeven

Sep. 1972

**ARC-10659**

Simultaneous reverse-osmosis tests conducted with centrifuges having multiple compartment heads are discussed. Equipment for retaining reverse-osmosis membrane is illustrated. Method of conducting tests is described.

**B72-10416****ELECTROMAGNETIC RHEOMETER**

R. H. Globus (Aerojet Liquid Rocket Co.) and J. A. Cabeal (Aerojet Liquid Rocket Co.)

Aug. 1972 See also B72-10026

**ARC-10525**

Force required to pull free a small circular plate imbedded in gel liquid is determined. Procedure for measuring the structure of a gel is given.

**B72-10418****TECHNIQUE FOR INCREASING YIELD OF TRIFLUORONITROSOMETHANE-TETRAFLUOROETHYLENE COPOLYMER**

S. A. Glickman (Thiokol Chem. Corp.)

Aug. 1972

**ARC-10566**

Polymerization technique using equimolar amounts of trifluoronitrosomethane and tetrafluoroethylene to increase yield of copolymer is described. Yields were increased by ninety percent and final product displayed better physical properties. Test equipment and chemical reactions for process are described.

**B72-10419****FREE-RADICAL SOLUTION-POLYMERIZATION OF TRIFLUORONITROSOMETHANE WITH TETRAFLUOROETHYLENE**

S. A. Glickman (Thiokol Chem. Corp.)

Aug. 1972

**ARC-10567**

Heavy-walled glass reactor, equipped with aerosol-compatible couplings and needle valve and charged with solvent and initiator, is utilized for polymerization. Polymer conversions and reactor/vessel operation are discussed.

**B72-10420****REGENERABLE METALLIC OXIDE SYSTEMS FOR REMOVAL OF CARBON DIOXIDE: A CONCEPT**

J. G. Sutton (Hamilton Std.), P. F. Heimlich (Hamilton Std.), and E. H. Tepper (Hamilton Std.)

Aug. 1972

**ARC-10570**

Design concepts for portable canisters for removal of carbon dioxide are described. One is screen pack configuration consisting of brazed rectangular canister with four metal oxide packs inserted. Other is radial flow canister with perforated central tube. Methods of production and operating principles are presented.

**B72-10421****SOLID AMINE COMPOUNDS AS SORBENTS FOR CARBON DIOXIDE: A CONCEPT**

J. G. Sutton (Hamilton Std.), P. F. Heimlich (Hamilton Std.), and E. H. Tepper (Hamilton Std.)

Aug. 1972

**ARC-10571**

Solid amine compounds were examined as possible absorbents for removal of carbon dioxide in life support systems of type which may be employed in high altitude aircraft, spacecraft, or submarines. Many solid amine compounds release absorbed carbon dioxide when heated in vacuum, therefore, when properly packaged spent amine compounds can be readily regenerated and put back into service.

**B72-10422****PHOSPHONIUM CHLORIDE FOR THERMAL STORAGE**

J. G. Sutton (Hamilton Std.), P. F. Heimlich (Hamilton Std.), and E. H. Tepper (Hamilton Std.)

Aug. 1972

**ARC-10572**

Development of systems for storage of thermal energy is discussed. Application of phosphonium chloride for heat storage through reversible dissociation is described. Chemical, physical, and thermodynamic properties of phosphonium chloride are analyzed and dangers in using phosphonium chloride are explained.

**B72-10423****FABRICATION OF CARBON FILM COMPOSITES FOR HIGH-STRENGTH STRUCTURES**

P. R. Preiswerk (Astro Res. Corp.) and M. Lippman (Astro Res. Corp.)

Aug. 1972 See also NASA-CR-1972

**ARC-10613**

Physical and mechanical properties of fiber composite materials consisting of carbon films are described. Application of carbon film structural composites for constructing microwave filters or optical instruments is proposed. Applications in aerospace and architectural structures for high strength and low density properties are discussed.

**B72-10424****IMPROVED MAGNESIA FOR THERMAL CONTROL COATINGS**

H. Levin (Hughes Aircraft Co.), C. C. Berggren (Hughes Aircraft Co.), and W. M. Peffley (Hughes Aircraft Co.)

Aug. 1972 See also NASA-CR-73337

**ARC-10677**

Formation of radiation-generated color centers using single crystals of magnesium oxide is discussed. Crystal structure of magnesium oxide is described. Chemical processes used to produce magnesium oxide with desired color center kinetics are presented. Proton irradiation of magnesium oxide crystals was conducted to determine lattice defects.

**B72-10425****ALUMINUM NITRIDE INSULATING FILMS FOR MOSFET DEVICES**

G. W. Lewicki and J. Maserjian

Aug. 1972

**NPO-11859**

Application of aluminum nitrides as electrical insulator for electric capacitors is discussed. Electrical properties of aluminum nitrides are analyzed and specific use with field effect transistors is defined. Operational limits of field effect transistors are developed.

**B72-10430****STRENGTHENING LIGHTWEIGHT CONCRETE**

A. Auskern

Jul. 1972

**AEC-10017**

Polymer absorption by lightweight concretes to improve bonding between cement and aggregate and to increase strength of cement is discussed. Compressive strength of treated cement is compared with strength of untreated product. Process for producing polymers is described.

**B72-10431****FLUIDIZED-BED COMBUSTION REDUCES ATMOSPHERIC POLLUTANTS**

A. A. Jonke

Dec. 1972

**AEC-10085**

Method of reducing sulfur and nitrogen oxides released during combustion of fossil fuels is described. Fuel is burned in fluidized bed of solids with simultaneous feeding of crushed or pulverized limestone to control emission. Process also offers high heat transfer rates and efficient contacting for gas-solid reactions.

**B72-10438****PROPOSED SEMICONDUCTOR FILM IMPROVEMENT**

H. M. Manasevit (N. Am. Aviation, Inc.)

Jul. 1972

**HQ-10685**

Film grown in inert carriers (A, He, or N) displays low impurity, high mobility, and improved crystal structure. Annealing steps used in growing process improves film quality and allows utilization of film for Gunn and LSA devices.

**B72-10439****ELECTRON BEAM CHEMISTRY PRODUCES HIGH PURITY METALS**

W. H. Philipp, C. E. May, S. J. Marsik, and R. A. Lad

Jul. 1972 See also NASA-TM-X-67982

**LEWIS-11639**

Application of radiation chemistry for deposition of metals by irradiation of aqueous solutions with high energy electrons is presented. Design of reaction vessel for irradiation of solution is illustrated. Features of radiochemical technique and procedures followed are described.

**B72-10449****LEACHING OF NITROSO RUBBER MATERIAL REMOVES UNCURED POLYMER**

W. A. Bratfisch (N. Am. Rockwell Corp.) and R. Gonzalez (N. Am. Rockwell Corp.)

Aug. 1972

**MSC-17185**

New leaching process removes uncured polymer from nitroso rubber, elastomer used in presence of nitrogen tetroxide. Uncured portion is removed by controlled soaking of polymer slab in Freon TF. Leaching with Freon TF prevents nitroso rubber from adhering to adjoining surfaces and limiting its usefulness in either static or dynamic applications.

**B72-10451****CHEMICAL MODIFICATION OF POLY(p-PHENYLENE) FOR USE IN ABLATIVE COMPOSITIONS**

J. A. Parker, A. H. Heimbuch, D. N. Vincent (N. Am. Rockwell Corp.), and C. L. Hammermesh (N. Am. Rockwell Corp.)

Aug. 1972

**ARC-10135**

Development of ablative materials based on modification of polyphenylene compounds is discussed. Chemical and physical properties are analyzed for application as heat resistant materials. Synthesis of linear polyphenylenes is described. Effects of exposure to oxyacetylene flame and composition of resultant char layer are presented.

**B72-10454****NONMETALLIC IMPURITIES IMPROVE MECHANICAL PROPERTIES OF VAPOR-DEPOSITED TUNGSTEN**

J. Chin (Gulf Gen. Atomic), A. F. Weinberg (Gulf Gen. Atomic), and J. R. Lindgren (Gulf Gen. Atomic)

Aug. 1972 See also B67-10232; B71-10212

**LEWIS-10800**

Mechanical properties of vapor deposited tungsten are improved by selective incorporation of various nonmetallic impurities. Addition of trace quantities of carbon, nitrogen, or oxygen can significantly increase both low and high temperature yield strength without greatly affecting ductile-to-brittle transition temperature.

**B72-10456****RADIATION-INDUCED NICKEL DEPOSITS**

S. J. Marsik and W. H. Philipp

Dec. 1972 See also NASA-SP-227

**LEWIS-10965**

Low cost, photographic process uses surface coating of nickel hypophosphite sensitive to X-rays and electron radiation. Exposed coated surface can be amplified to produce permanent visible image of wide tonal gradation in grays. Coating may be sodium, ammonium, or lithium hypophosphite or sodium rhosphite, with nickel supplied in developer.

**B72-10464****PHASE-CHANGE MATERIALS HANDBOOK**

D. V. Hale (Lockheed Missiles and Space Co.), M. J. Hoover (Lockheed Missiles and Space Co.), and M. J. O'Neill (Lockheed Missiles and Space Co.)

Aug. 1972

**M-FS-22064**

Handbook describes relationship between phase-change materials and more conventional thermal control techniques and discusses materials' space and terrestrial applications. Material properties of most promising phase-change materials and purposes and uses of metallic filler materials in phase-change material composites are provided.

**B72-10469****RESEARCH ON BEARING LUBRICANTS FOR USE IN A HIGH VACUUM**

M. E. Campbell (Midwest Res. Inst.) and H. Hass (Midwest Res. Inst.)

Aug. 1972

**M-FS-22119**

Work, during the research program, was concentrated on lubricant development, gear lubrication and evaluation, providing coated test specimens, advising NASA contractors about solid lubrication specific applications, and investigation of new method of attaching lubricating solids to bearing surfaces by sputtering technique.

**B72-10473****PROCESS FOR SYNTHESIZING AND FORMULATING CONDENSED RING POLYMERS**

C. T. Hughes (Avco Corp.) and R. J. McHenry (Avco Corp.)

Aug. 1972 See also NASA-CR-1633

**LANGLEY-10423**

Chemical process for forming low molecular weight, fully cyclized heteroaromatic prepolymers under conditions which limit chain extension or branching is described. Exact procedures used in conducting chemical reaction are defined. Advantages of process over conventional methods are presented.

**B72-10491****FLOATING ZONE PROCESS FOR DRAWING SMALL DIAMETER FIBERS OF REFRACTORY MATERIALS**

L. J. Westfall (Little / Arthur D., Inc.), J. Haggerty, W. P. Menashi (Little / Arthur D., Inc.), and J. F. Wenckus (Little / Arthur D., Inc.)

Aug. 1972 See also NASA-CR-72811

**LEWIS-11380**

New process produces controlled purity, very high strength, single crystal fibers of materials with melting points to 4000 C. Process has been used to make single crystal fibers of highly refractory ceramics such as aluminum oxide, titanium carbide and yttrium oxide.

**B72-10493****FUNCTIONALLY TERMINATED LIQUID NITROSO FLUORO-CARBON TERPOLYMERS**

N. Mayes (Thiokol Chem. Corp.) and A. Marcellis (Thiokol Chem. Corp.)

Aug. 1972

**M-FS-21539**

Properties of polymer for conformal coating for electronic circuitry are described. Nitroso fluorocarbon polymers were selected for application. Chemical reactions for production of polymers are discussed. Technique allows regulation of crosslink densities, molecular weight, and viscosity.

**B72-10503****EQUATIONS TO ASSESS THE IMPACT RESISTANCE OF**

## 04 MATERIALS/CHEMISTRY

### FIBER COMPOSITES

C. C. Chamis, M. P. Hanson, and T. T. Serafini  
Aug. 1972 See also NASA-TM-X-67802; NASA-TN-D-64643  
**LEWIS-11486**

Numerical analysis of impact resistance of composite materials containing fibers is discussed. Mathematical model of longitudinal impact resistance is presented. Potential impact resistance of various fiber composites as obtained by numerical analysis is presented as plotted curve.

### B72-10511 IMPROVED METHOD FOR RECLAIMING VACUUM DIFFUSION PUMP OIL

A. E. Buggele and R. K. Lohwater (Bendix Corp.)  
Aug. 1972

**LEWIS-11647**

High vacuum centrifugal molecular distillation system rapidly reclaims contaminated diffusion pump oil in continuous operation and restores it to high level of purity.

### B72-10514 ADVANCED ALLOY DESIGN TECHNIQUE: HIGH TEM- PERATURE COBALT BASE SUPERALLOY

R. L. Dreshfield, J. C. Freche, and G. D. Sandrock  
Aug. 1972 See also NASA-TN-D-6147

**LEWIS-10436**

Advanced alloy design technique was developed for treating alloys that will have extended life in service at high temperature and intermediate temperatures. Process stabilizes microstructure of the alloy by designing it so that compound identified with embrittlement is eliminated or minimized. Design process is being used to develop both nickel and cobalt-base superalloys.

### B72-10515 THERMOCOUPLE TAPE

G. A. Mazaris, Jr. and R. D. Thomas  
Dec. 1972 See also N71-31123

**LEWIS-11072**

Preformed, low cost, thin film thermocouples on adhesive tapes were fabricated. Metal strips of two dissimilar metals were laid on opposite edges of plastic substrate so that they overlap in center portion, forming thermocouple junction. Useful temperature range for polyimide films was 4 to 673 K.

### B72-10517 HUMIDITY RESISTANT SOLAR CELL CONTACTS

C. J. Bishop (Boeing Co.)

Aug. 1972

**HQ-10674**

Gold-platinum solar cell contact is developed which does not exhibit chemical reactivity of titanium or porosity of silver. This contact offers excellent ohmic characteristics and stability in humid air.

### B72-10519 SINTERED DIAMOND COMPACTS USING METALLIC COBALT BINDERS

W. F. Libby (Calif. Univ.) and H. Katzman (Calif. Univ.)

Aug. 1972

**HQ-10706**

Method is developed for sintering diamond powder which uses metallic cobalt as binder. Present samples show maximum microhardness of over 3000 kg/sq mm on Knoop scale. Material may be used as hard surface coating or may compete with cubic boron nitride as abrasive grain.

### B72-10529 PREPARATION OF STABLE COLLOIDAL DISPERSIONS IN FLUORINATED LIQUIDS

R. Kaiser (Avco Corp.)

Aug. 1972

**HQ-10580**

Chemical method for separating oil from water by liquid barrier which can be positioned magnetically is described. Fluorocarbon liquids containing colloidal suspension of magnetite

is proposed. Chemical composition of magnetite and fluorinated ether polymer are presented.

### B72-10544 AN IMPROVED GAS EXTRACTION FURNACE

R. B. Wilkin (Brown and Root/Northrop)

Sep. 1972

**MSC-14138**

Design of glass furnace for analysis of rocks to determine nature and amount of trapped gas is described. Furnace heats specimen in vacuum conditions by radio frequency induction. Diagram of apparatus to show construction and operation is provided.

### B72-10550 IMMOBILIZED PHOSPHORYLASE FOR SYNTHESIS OF POLYSACCHARIDES FROM GLUCOSE

D. L. Marshall (Battelle Mem. Inst.)

Sep. 1972

**ARC-10680**

Continuous processes for enzymatic production of carbohydrates from glucose are discussed. Key reactant in process is identified as phosphorylase which catalyzes reversible formation or degradation of polysaccharide. Chemical compounds and reactions to synthesize polysaccharides are analyzed.

### B72-10551 PTFE FILMS WITH IMPROVED FLEXIBILITY

R. F. Muraca (Stanford Res. Inst.) and A. A. Koch (Stanford Res. Inst.)

Oct. 1972 See also B72-10552

**NPO-12028**

Development and application of flexible polytetrafluoroethylene films for expulsion bladders in spacecraft propellant tanks are described. Flexibility of material is obtained by reducing crystallinity through annealing and quenching in water. Physical and mechanical properties of material are presented.

### B72-10553 NEW TYPE OF TRIFUNCTIONAL ALCOHOL

H. E. Marsh, Jr. and J. J. Hutchison

Sep. 1972

**NPO-10714**

New type of trifunctional alcohol was synthesized from commercially available trimer acid. Trifunctional alcohol is hydrocarbon with widely separated terminal hydroxyl groups, and was expressly developed as crosslinking agent for preparation of polyurethane propellants, binders and case liners.

### B72-10560 SUPPRESSANTS FOR LOWERING PROPELLANT BINDER BURNING RATE

W. W. Thompson (Rocketdyne)

Sep. 1972

**ARC-10563**

Addition of boron compound to lower burning rate of solid propellant binder is reported. Chemical reactions involved in propellant binder modification are described. Advantages of method for lowering burning rate are analyzed.

### B72-10565 ANALYSIS OF MICROSIZE PARTICULATES

M. B. Blanchard, N. H. Farlow, and G. V. Ferry

Sep. 1972 See also AIAA-PAPER-71-1104

**ARC-10647**

Unique methods for analyzing individual particles ranging in size from 0.01 to 1000 micrometers have been developed for investigation of nature of cosmic dust. Methods are applicable to particulate aerosols and contaminants characteristically encountered in studies of air pollution and in experiments designed to abate pollution.

### B72-10566 ASSESSMENT OF WATER POLLUTION BY AIRBORNE MEASUREMENT OF CHLOROPHYLL

J. C. Arvesen, E. C. Weaver, and J. P. Milland

Oct. 1972

**ARC-10648**

Remote measurement of chlorophyll concentrations to determine extent of water pollution is discussed. Construction and operation of radiometer to provide measurement capability are explained. Diagram of equipment is provided.

**B72-10570****OXYGEN PLASMAS USED TO SYNTHESIZE SUPEROXIDES**

J. R. Hollahan and T. Wydeven

Sep. 1972

**ARC-10686**

Production of alkali metal superoxides by interaction of molecular oxygen with alkali metals or their salts is discussed. Diagram of reactor to show components and operating principles is provided. Analysis of chemical reactions involved is developed.

**B72-10580****CHEMICAL KINETICS COMPUTER PROGRAM FOR STATIC AND FLOW REACTIONS**

D. A. Bittker and V. J. Scullin

Sep. 1972

**LEWIS-11467**

General chemical kinetics computer program for complex gas mixtures has been developed. Program can be used for any homogeneous reaction in either one dimensional flow or static system. It is flexible, accurate, and easy to use. It can be used for any chemical system for which species thermodynamic data and reaction rate constant data are known.

**B72-10583****STUDY OF HOT HARDNESS CHARACTERISTICS OF TOOL STEELS**

J. L. Chevalier (Army Air Mobility R and D Lab.), M. W. Dietrich, and E. V. Zaretsky

Sep. 1972 See also NASA-TN-D-6632

**LEWIS-11785**

Hardness measurements of tool steel materials in electric furnace at elevated temperatures and low oxygen environment are discussed. Development of equation to predict short term hardness as function of initial room temperature hardness of steel is reported. Types of steel involved in the process are identified.

**B72-10587****THERMAL CONDUCTIVITY AND ELECTRICAL RESISTIVITY OF POROUS MATERIALS**

J. C. Y. Koh (Boeing Co.) and A. Fortini

Oct. 1972 See also NASA-CR-120854

**LEWIS-11754**

Process for determining thermal conductivity and electrical resistivity of porous materials is described. Characteristics of materials are identified and used in development of mathematical models. Limitations of method are examined.

**B72-10592****HIGH STRENGTH HIGH MODULUS CERAMIC FIBER**

R. N. Fetterolf (Babcock and Wilcox Co.)

Sep. 1972

**M-FS-21266**

Low cost method was developed for producing high strength, high modulus, continuous ceramic oxide fibers. Process transforms inexpensive metallic salts into syrup-like liquids that can be fiberized at room temperatures. Resulting salt fibers are then converted to oxides by calcination at relatively low temperatures.

**B72-10594****SPARK ULTRASONIC TRANSDUCER**

J. M. Hoop

Dec. 1972

**M-FS-21233**

Nondestructive testing by spark transducer induces ultrasonic pulses in materials without physical contact. High power pulse generator connected to step up transformer produces sparking between two tungsten rods and ultrasonic energy pulses in test samples placed between rods.

**B72-10596****INVESTIGATION OF ENVIRONMENTAL EFFECTS ON COATINGS FOR THERMAL CONTROL**

N. A. Ashford (IIT Res. Inst.), J. E. Gilligan (IIT Res. Inst.), and G. A. Zerlaut (IIT Res. Inst.)

Dec. 1972

**M-FS-21932**

Accomplishments made during study of coatings are reported. Development of structure/property theory for selecting most appropriate pigments for space vehicle paints is discussed along with improvements made in zinc-oxide pigmented potassium silicate paint.

**B72-10612****FLEXIBLE THERMAL DEVICE**

S. D. Wallace (McDonnell-Douglas Corp.) and D. H. Elliott (McDonnell-Douglas Corp.)

Oct. 1972

**M-FS-21630**

Fabrication of expansion joint, vibration isolator device with sufficient cross sectional area for high thermal conductivity is discussed. Device consists of multiple layers of metal foil which may be designed to meet specific applications. Thermodynamic properties of the device and illustration of construction are provided.

**B72-10627****DESIGN CRITERIA MONOGRAPH FOR HIGH-LOAD HIGH-SPEED ROLLING-CONTACT BEARINGS**

Innovator not given (Lewis Res. Center) Nov. 1972 See also NASA-SP-8048

**LEWIS-11823**

Monograph was published which summarizes and systematically orders large body of successful techniques and practices developed for design of liquid rocket engine turbopump bearings. Document was written to organize and present significant experience and knowledge accumulated by NASA in development and operational programs.

**B72-10628****POLYIMIDE BONDED GRAPHITE FLUORIDE: A NEW LONG LIFE SOLID LUBRICANT COATING**

R. L. Fusaro and H. E. Sliney

Nov. 1972 See also NASA-TN-D-6714

**LEWIS-11864**

Solid lubricant film consisting of polyimide varnish as binder and graphite fluoride as lubricant is described. Comparative wear tests with other solid lubricants were conducted and results are shown in graph form. Test equipment used in conducting wear tests is reported.

**B72-10633****DESIGN CRITERIA MONOGRAPH FOR PRESSURIZED METAL CASES**

Innovator not given (Lewis Res. Center) 1972 See also NASA-SP-8025

**LEWIS-11835**

Organization and presentation of data pertaining to design of solid propellant rocket engine cases are discussed. Design criteria are presented in form of monograph based on accumulated experience and knowledge. Improvements in reliability, cost effectiveness, and engine efficiency are stressed.

**B72-10666****AUTOMATION OF BOSCH REACTION FOR CO<sub>2</sub> REDUCTION**

R. F. Holmes (Gen. Dyn. Corp.)

Dec. 1972

**M-FS-21674**

System for collecting excess carbon dioxide in space cabin is described. System collects carbon dioxide exhaled by human inhabitants and decomposes gas into carbon and water by reaction with hydrogen in presence of catalyst. Diagram of equipment involved in reaction is included.

## 04 MATERIALS/CHEMISTRY

**B72-10684**

### **TUNGSTEN-REINFORCED TANTALUM**

R. J. Bacigalupi and R. Breitwieser

Dec. 1972

**LEWIS-11750**

Method is described for producing tungsten-reinforced tantalum, a material possessing the high temperature strength of tungsten and room temperature ductility and weldability of tantalum. This material is produced by bonding together and overlaying structure of tungsten wires with chemical vapor deposited tantalum.

**B72-10709**

### **ULTRAVIOLET AND THERMALLY STABLE POLYMER COMPOSITIONS**

M. J. Adamson, H. R. Gloria, R. E. Goldsberry, and R. F. Reinisch

Dec. 1972

**ARC-10592**

Copolymers produced from aromatic substituted aromatic azine-siloxane compositions are thermally stable, solar ultraviolet light non-degradable by wavelengths shorter than those reaching earth surface.

**B72-10710**

### **REVERSE-OSMOSIS MEMBRANES BY PLASMA POLYMERIZATION**

J. R. Hollahan and T. Wydeven

Dec. 1972

**ARC-10696**

Thin allyl amine polymer films were developed using plasma polymerization. Resulting dry composite membranes effectively reject sodium chloride during reverse osmosis. Films are 98% sodium chloride rejective, and 46% urea rejective.

**B72-10711**

### **IMPROVED ZINC OXIDE THERMAL CONTROL COATINGS**

T. Freund (Stanford Res. Inst.) and S. R. Morrison (Stanford Res. Inst.)

Dec. 1972

**NPO-11139**

Ferricyanide/ferrocyanide couple prevents zinc oxide pigment degradation in thermal control coatings. Chemical couple retards physical optical property changes.

**B72-10717**

### **IMPROVED TRANSMITTANCE MEASUREMENT WITH A MAGNESIUM OXIDE COATED INTEGRATING SPHERE**

R. L. Bowman and E. W. Spisz

Dec. 1972 See also NASA-TM-X-2395

**LEWIS-11840**

Simple and convenient technique has been found for extending transmittance measurement capability of conventional magnesium oxide coated integrating sphere system at low (near ultraviolet) wavelengths. Technique can be used to determine effect of contaminants on window materials and can also be used for measurements on thermal control coatings and telescope mirrors.

**B72-10725**

### **HIGH FIELD CdS DETECTOR FOR INFRARED RADIATION**

R. C. Tyagi (Nat'l. Res. Council), K. W. Boer (Del. Univ.), H. C. Hadley (Del. Univ.), and J. B. Robertson

Dec. 1972

**LANGLEY-11027**

New and highly sensitive method of detecting infrared irradiation makes possible solid state infrared detector which is more sensitive near room temperature than usual photoconductive low band gap semiconductor devices. Reconfiguration of high field domains in cadmium sulphide crystals provides basis for discovery.

**B72-10728**

### **LOW-VOID POLYIMIDE RESINS FOR AUTOCLAVE PROCESSING**

R. J. Jones (TRW Systems) and R. W. Vaughan (TRW Systems)

Dec. 1972 See also B69-10118; B70-10300; B70-10330;

B70-10504; B71-10442; B72-10175; NASA-CR-72984

**LEWIS-11665**

Development of an advanced A-type polyimide, which can be used to produce autoclave molded, low-void content composites suitable for use at temperatures up to 316 C is reported. It consists of a mixture of methyl nadic anhydride, an 80:20 molar ratio of methylene dianiline and thiodianiline, and pyromellitic dianhydride.

**B72-10740**

### **BORON-10 LOADED INORGANIC SHIELDING MATERIAL**

S. I. Baker (IIT Res. Inst.) and R. S. Ryskiewicz (IIT Res. Inst.)

Dec. 1972

**M-FS-22280**

Shielding material containing Boron 10 and gadolinium for neutron absorption has been developed to reduce interference from low energy neutrons in measurement of fission neutron spectrum using Li-6 fast neutron spectrometer.

**B72-10742**

### **HEAT TRANSFER CORRELATIONS FOR KEROSENE FUELS AND MIXTURES AND PHYSICAL PROPERTIES FOR JET A FUEL**

G. H. Ackerman (Shell Oil Co.) and L. E. Faith (Shell Oil Co.)

Dec. 1972 See also LEWIS-11653; NASA-CR-72951

**LEWIS-11652**

Heat transfer correlations are reported for conventional Jet A fuel for both laminar and turbulent flow in circular tubes. Correlations were developed for cooling in turbine engines, but have broader applications in petroleum and chemical processing, and other industrial applications.

**B72-10746**

### **A STABLE LIQUID CRYSTAL FOR ELECTRO-OPTICAL DISPLAYS**

M. M. Lakes (Temple Univ.)

Dec. 1972

**HQ-10714**

Method is reported for substitution of hydroxy (OH) group ortho to anil linkage to stabilize anil-type liquid crystal for use in electro-optical devices.

## 05 LIFE SCIENCES

**B72-10006**

### **COVALENT BONDING OF ANTIBODIES OF POLYSTYRENE LATEX BEADS: A CONCEPT**

H. J. Tenoso (Aerojet-Gen.) and D. G. Smith (Aerojet-Gen.)

1972

**MSC-13906**

Technique facilitates purification of vaccines and production of immunoabsorption columns exhibiting relatively long stability. Information interests biochemists, medical researchers, and pharmaceutical manufacturers.

**B72-10017**

### **QUICK, EASY TO PREPARE FREEZE-DRIED SOUPS**

R. V. Ramirez (Whirlpool Corp.) and R. W. Larson (Whirlpool Corp.)

1972

**MSC-14003**

Major advantages of soups are that they totally rehydrate in less than five minutes in water at approximately 150 deg F, maintain flavor and quality stability for two weeks in a 100 F environment, and remain stable for considerably longer at ambient temperatures. They are suitable for either household or field use.

**B72-10031**

### **NEW REACTION TESTER ACCURATE WITHIN 56 MICRO-SECONDS**

H. Brown (GE)

1972

**MSC-13604**

Testing device measures simple and disjunctive reaction time of human subject to light stimuli. Tester consists of reaction key, logic card, panel mounted neon indicators, and interconnecting wiring. Device is used for determining reaction times of patients undergoing postoperative neurological therapy.

**B72-10032****AN IMPROVED AESTHESIO METER**

D. Wright (GE) and R. Richardson (GE)

1972

**MSC-13609**

Biomedical tool measures cutaneous sensory perception by allowing consistent application of regular and determinable pressure to skin of the individual. Device is of relatively simple construction, inexpensive to manufacture, and easy to operate.

**B72-10035****IMPLANTED TELEMETER FOR ELECTROCARDIOGRAM AND BODY TEMPERATURE**

W. F. Barrows

1972

**XAC-08505**

Measuring system requiring one blocking oscillator to generate modulated pulse repetition rate is implantable in the bodies of small animals. Device has life of two years and transmission range of about three feet. EKG sensing unit also is used to sense electromyogram or electrooculogram of laboratory animals.

**B72-10046****WEIGHT SIMULATOR**

W. H. Howard and D. R. Young

1972

**ARC-10100**

Device applies compressive force to bone to minimize loss of bone calcium during weightlessness or bedrest. Force is applied through weights, or hydraulic, pneumatic or electrically actuated devices. Device is lightweight and easy to maintain and operate.

**B72-10061****A DIFFERENTIAL ECG AMPLIFIER WITH SINGLE-ENDED OUTPUT**

L. Katchis (Radionics, Inc.)

1972

**ARC-10411**

Three-stage amplifier is used for ECG measurements which require conversion of differential input to single-ended output. Circuit may be useful in biological telemetry for amplification of signals from specimen-implanted sensors.

**B72-10062****STABILIZATION OF LACTATE DEHYDROGENASE**

O. M. Friedman (Collaborative Res., Inc.)

1972 See also NASA-CR-73460

**ARC-10415**

Addition of substances such as dimethylsulfoxide, glycerol, and gelatin to aqueous solutions of lactate dehydrogenase maintains enzymes in stable and fully active form when stored at 2 - 6 C.

**B72-10125****TIME-LAPSE CAMERA FOR MICROSCOPY**

J. E. Cook (Tex. Univ.)

1972

**ARC-10423**

Compact, lightweight camera which advances film frames without use of conventional sprockets and slip clutches obtains time lapse photomicrographs of human cell growth in a zero-G environment over a period of about a month.

**B72-10126****PROGRAMMED PHYSIOLOGICAL INFUSION SYSTEM**

W. H. Howard, D. R. Young, and R. R. Adachi

1972

**ARC-10447**

Infusion system delivers incremental volumes from a reservoir

with a piston pump at a rate that varies in time and follows the envelope of a preprogrammed curve.

**B72-10168****SPACE-SUIT CARBON DIOXIDE ABSORPTION SYSTEM: A CONCEPT**

R. J. Copeland (Vought Missiles and Space Co.) and B. W. Webbon (Vought Missiles and Space Co.)

1972 See also NASA-CR-114321

**ARC-10546**

Partial pressure of carbon dioxide within a space suit is maintained at safe levels by regenerating carbon dioxide with potassium hydroxide solution on board spacecraft or by portable units.

**B72-10189****CINE RECORDING OPHTHALMOSCOPE**

J. W. Fitzgerald

May 1972

**ARC-10399**

Camera system provides accurate photographic recording during acceleration of centrifuge and permits immediate observation of dynamic changes in retinal circulation by a closed-circuit television loop. System consists of main camera, remote control unit, and strobe power supply unit, and is used for fluorescein studies and dynamometry sequences.

**B72-10193****PROJECTIONS OF SCAN PATTERNS ON HUMAN RETINA**

D. H. Kelly (Stanford Res. Inst.) and H. D. Crane (Stanford Res. Inst.)

May 1972 See also NASA-CR-1121

**ARC-10181**

Fundus camera tracks eye movements by using camera optics with the aid of an inverted system. Camera provides a flying-spot circular scanning light source in the normal film plane and a broadband photodetector in position normally occupied by light source.

**B72-10194****CARBON DIOXIDE CONCENTRATOR**

C. F. Williams (TRW, Inc.) and R. G. Huebscher (TRW, Inc.)

May 1972 See also NASA-CR-73397

**ARC-10245**

Device passed exhaled air through electrochemical cell containing alkali metal carbonate aqueous solution, and utilized platinum electrodes causing reaction of oxygen at cathode with water in electrolyte, producing hydroxyl ions which react with carbon dioxide to form carbonate ions.

**B72-10195****AIRCREW OXYGEN SYSTEM**

A. D. Babinsky (TRW, Inc.), R. J. Kiraly (TRW, Inc.), and R. A. Wynveen (TRW, Inc.)

May 1972

**ARC-10247**

Closed-loop rebreather system which includes pilot provides oxygen for use in aircraft by safe, reliable method of low weight and size and reduces expense of ground equipment. Water electrolysis generated oxygen is fed into rebreather loop which allows nitrogen elimination and water and carbon dioxide removal.

**B72-10200****HEART CATHETER CABLE AND CONNECTOR**

D. R. Harrison, F. L. Cota, and H. Sandler

May 1972

**ARC-10406**

Ultraminiature catheter cables that are stiff enough for intravenous insertion yet flexible at the tip, sterilizable, and economical are fabricated entirely from commercially available parts. Assembly includes air passageway for reference pressures and coaxial cable for transmission of signals from the tip of catheter.

**B72-10203****VISUAL SENSITIVITY TESTER**



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R. F. Haines, J. W. Fitzgerald, and S. A. Rositano  
May 1972 See also NASA-TN-D-6190  
**ARC-10329**

Testing device uses closed loop film cassettes to project programmed visual stimuli on screen which the observer views through a lens making the stimuli appear to be at optical infinity. Tester is useful for determining changes in glaucomatous visual field sensitivity.

**B72-10205**  
**A DUAL-BEAM ACTINIC LIGHT SOURCE FOR PHOTOSYNTHESIS RESEARCH**  
A. P. Margozi and M. E. Henderson  
May 1972  
**ARC-10351**

Simulation of photosynthetic process in plants is accomplished by using two separate and identical optical channels that provide independently adjustable wavelengths (filters), shutter sequencing, and control intensity of illumination. In addition to experiments using electron paramagnetic resonance spectroscopy, system may be applicable to other types of research in photosynthetic field.

**B72-10219**  
**COUNTER LUNG**  
A. D. Babinsky (TRW, Inc.) and R. J. Kiraly (TRW, Inc.)  
1972 See also NASA-CR-73396  
**ARC-10248**

Counter lung, incorporated in closed-loop rebreathing system, accommodates user's breathing tidal volume so that the loop pressure is relatively constant during breathing cycles.

**B72-10220**  
**SCANNING TECHNIQUE FOR TRACKING SMALL EYE-MOVEMENTS**  
D. H. Kelly (Stanford Res. Inst.) and H. D. Crane (Stanford Res. Inst.)  
1972 See also NASA-CR-114307  
**ARC-10488**

Scanning technique images spot of blue light on fundus, measures variations in reflectance of spot and compares reflectance pattern with a stored reference pattern. Method then converts the difference from stored pattern into infrared eye motion.

**B72-10224**  
**EAR OXIMETER-TRANSDUCER MONITORS FOUR PHYSIOLOGICAL RESPONSES**  
J. R. Smith, Jr.  
1972  
**XAC-05422**

Device monitors blood oxygen saturation, blood pressure, pulse rate, and pulse-pressure curve during conditions of high stress in simulated space flight.

**B72-10229**  
**CONTINUOUS MONITOR FOR GAS RATIOS IN A MIXTURE**  
S. H. Gorland and M. J. Leroy, Jr.  
May 1972 See also B67-10063; NASA-TM-X-1939  
**LEWIS-11095**

Fluidic oscillator, incorporating piezoelectric transducer to sense molecular weight of gas mixture, is used to continuously monitor ratio of a mixture of two gases in a flowing system. Device is lightweight, compact, reliable, easy to install, and also produces a simple output signal for controller. Frequency of oscillation is measured and signal converted to ac output.

**B72-10233**  
**MERCURY IN THE ENVIRONMENT**  
W. Fulkerson, W. S. Lyon, W. D. Shults, and R. A. Wallace  
Dec. 1972 See also ORNL-NSF-EP-1  
**AEC-10048**

Problems in assessing mercury concentrations in environmental materials are discussed. Data for situations involving air, water, rocks, soils, sediments, sludges, fossil fuels, plants, animals, foods, and man are drawn together and briefly evaluated. Details are provided regarding the toxicity of mercury along with tentative

standards and guidelines for mercury in air, drinking water, and food.

**B72-10243**  
**QUARTZ CRYSTAL MICROBALANCE USE IN BIOLOGICAL STUDIES**  
R. H. Green, J. F. Godfrey, E. G. Laue, T. M. Laue, W. W. Paik, and M. D. Wardle  
Aug. 1972  
**NPO-11346**

Design, development, and applications of quartz crystal microbalance are discussed. Two types of crystals are used. One serves as reference and other senses changes in mass. Specific application to study of bacterial spores is described.

**B72-10279**  
**BALANCED-BELLOWS SPIROMETER**  
G. G. Holden and J. R. Smith, Jr.  
Sep. 1972  
**XAC-01547**

Compact balanced-bellows dry type spirometer was designed to be insensitive to acceleration fields along any or all coordinate axes. It provides true indication of respiratory action of test subject without need for calibration in acceleration fields.

**B72-10281**  
**IMPROVED TEMPERATURE CONTROL OF LIQUID COOLING GARMENTS**  
C. W. G. Flucher (GE)  
Jun. 1972 See also NASA-CR-115122  
**MSC-13917**

Skin and auditory meatus temperature readings, supply control signal for temperature control valve in fluid temperature control system which provides increased subject comfort and responds to directly measured physiological cooling needs. System applications include medical care and thermal protection garment manufacturing.

**B72-10297**  
**SPACE SUIT MAY HAVE ORTHOTIC APPLICATIONS**  
H. C. Vykukal  
Sep. 1972  
**ARC-10275**

Application of movable joints for spacesuits to orthotic and prosthetic devices is discussed. Specifications of the joints, degrees of movement, and details of construction are described. Illustrations of the equipment are provided.

**B72-10298**  
**REAL-TIME PAIR-FEEDING OF ANIMALS**  
H. A. Leon, J. P. Connolly, M. J. Hitchman, and J. E. Humbert  
Sep. 1972  
**ARC-10302**

Automatic pair-feeding system was developed which immediately dispenses same amount of food to control animal as has been consumed by experimental animal that has free access to food. System consists of: master feeding system; slave feeding station; and control mechanism. Technique performs real time pair-feeding without attendant time lag.

**B72-10301**  
**PROTECTIVE ENCAPSULATION OF IMPLANTABLE BIOTELEMETRY UNITS**  
N. C. Tombs and J. M. Pope  
Sep. 1972  
**ARC-10514**

Development of materials for encapsulating electronic devices used in biotelemetry is discussed. Chemical resistance of materials to effects of animal fluids is described. Silicone rubber is recommended as basic material with polymers applied to outer surface for protective coating.

**B72-10303**  
**CUTTING THIN SECTIONS OF BONE**  
W. W. Ashley  
Sep. 1972

**ARC-10555**

Medical equipment for obtaining repetitive planoparallel sections of bone to study healing of bone structure under high gravity stress is described. Device consists of modified saw with diamond cutting edges. Construction of device and manner of use are explained.

**B72-10334****BLOOD PRESSURE MEASUREMENT AND DISPLAY SYSTEM**

A. J. Farkas  
Dec. 1972

**MSC-13036**

System is described that employs solid state circuitry to transmit visual display of patient's blood pressure. Response of sphygmomanometer cuff and microphone provides input signals. Signals and their amplitudes, from turn-on time to turn-off time, are continuously fed to data transmitter which transmits to display device.

**B72-10371****SMALL, LOW COST, ARTIFICIAL KIDNEY**

A. R. Lavender and F. W. Markley

Dec. 1972

**AEC-10011**

Disposable hemodialyzer is described that can be used at home by non-medically trained personnel. Short lengths of semipermeable membrane tubes are arranged in parallel, supported by plastic mesh and encased in epoxy at ends. Tubes are connected to input and output blood manifolds which are separated by dialysate chamber. Daily dialysis requires only two hours or less.

**B72-10391****COMPRESSION AND R-WAVE DETECTION OF ECG/VCG DATA**

W. L. Hayden (TRW Systems Group), M. F. Conover (TRW Systems Group), and W. P. Bennett (TRW Systems Group)

Jul. 1972 See also NASA-CR-115177

**MSC-14126; MSC-14127**

Application of information theory to eliminate redundant part of electrocardiogram or vectorcardiogram is described. Operation of medical equipment to obtain three dimensional study of patient is discussed. Use of fast Fourier transform to accomplish data compression is explained.

**B72-10395****MICROBIOLOGICAL SURFACE SAMPLING CART**

J. R. Wilkins and S. M. Mills

Jul. 1972

**LANGLEY-11069**

Mobile sampling cart automatically swabs surfaces for the recovery of microorganisms. Unit operates without human involvement and provides for control of swabbing speed, rotation of cotton swab, and the pressure and angle applied to swab. Capability of reverse direction is also available. Sampling cart use is limited to flat surfaces.

**B72-10402****A CONTINUOUS PHYSIOLOGICAL DATA COLLECTOR**

J. C. Bush

Jul. 1972

**M-FS-20835**

COP-DAC system utilizes oxygen and carbon dioxide analyzers, gas-flow meter, gas breathe-through system, analog computer, and data storage system to provide actual rather than average measurements of physiological and metabolic functions.

**B72-10415****SILVER STAIN FOR ELECTRON MICROSCOPY**

R. L. Corbett

Sep. 1972

**ARC-10661**

Ammoniacal silver stain used for light microscopy was adapted advantageously for use with very thin biological sections required for electron microscopy. Silver stain can be performed in short

time, has more contrast, and is especially useful for low power electron microscopy.

**B72-10429****PHOSPHORUS IN LAND-WATER SYSTEMS**

W. B. Bonner and T. Tamura

Dec. 1972

**AEC-10049**

Analyses were made to obtain information on distribution of different forms of phosphate in different environmental media, including soils, eroding material, and bottom sediment. Major emphasis was placed on determining several forms of inorganic phosphate in each medium. Results show that eroding material can transport significant quantities of phosphates from soils.

**B72-10450****ULTRASONIC BONE DENSITOMETER**

J. M. Hoop

Aug. 1972

**M-FS-20994**

Human bone density changes can be determined by a device originally developed for in-flight testing of astronauts' bones during extended space missions. Device is comparable in size, weight and power consumption to portable television set.

**B72-10461****INTRAVENOUS FLUID FLOW METER CONCEPT FOR ZERO GRAVITY ENVIRONMENT**

C. G. Miller (Serv. Technol. Corp.)

Aug. 1972

**MSC-14123**

Measuring chamber, included in infusion-set tubing, and peristaltic flow meter concept can be incorporated into flow meter that measures fluid flow rates between 100 and 600 cu cm per hour and at the same time maintains sterilization.

**B72-10482****A MAGNETIC MOUSE ACTIVITY METER**

J. Henry (Univ. of Southern Calif.), R. P. Rader (Univ. of Southern Calif.), and J. P. Henry

Aug. 1972

**HQ-10664**

Activity meter has been developed using Hall effect devices that record passage of selected groups of magnetically tagged mice. Two small permanent magnets are implanted in belly and back of selected mice and electronic circuits are activated as mice move between cages. System has advantage over tagging, detecting, and identification methods currently used.

**B72-10512****ELECTRONIC CIRCUIT DETECTS LEFT VENTRICULAR EJECTION EVENTS IN CARDIOVASCULAR SYSTEM**

V. D. Gebben and J. A. Webb, Jr.

Aug. 1972

**LEWIS-11581**

Electronic circuit processes arterial blood pressure waveform to produce discrete signals that coincide with beginning and end of left ventricular ejection. Output signals provide timing signals for computers that monitor cardiovascular systems. Circuit operates reliably for heart rates between 50 and 200 beats per minute.

**B72-10522****AN EFFICIENT, SIMPLE DIALYZER**

S. A. Miller (Emory Univ.)

Dec. 1972

**HQ-10741**

Easily assembled, efficient, countercurrent, sandwich-type barrier dialyzer was developed. Dialyzer contains six blood chambers that provide 500 sq cm membrane area. Design membranes are cuprammonium cellulose film. Unit performance was compared with thirteen other dialyzers.

**B72-10525****A REUSABLE PREPOSITIONED ATP REACTION CHAMBER**

D. G. Hoffman (Bisopherics, Inc.)

## 05 LIFE SCIENCES

Aug. 1972

**HQ-10660**

Luminescence biometer detects presence of life by means of light-emitting chemical reaction of luciferin and luciferase with adenosine triphosphate (ATP) that occurs in all living cells. Amount of light in reaction chamber is measured to determine presence and extent of life.

**B72-10526**

**CARBON DIOXIDE CONCENTRATION INDICATOR**

P. H. King (GE)

Aug. 1972

**HQ-10582**

Device will provide visual indication of concentration of carbon dioxide. It consists of small amounts of absorbent material contained in semipermeable membrane and device to detect color changes. Material will absorb quantity of carbon dioxide proportional to carbon dioxide concentration in atmosphere. Amount of absorption is indicated by color change.

**B72-10531**

**SENSOR CAPSULE FOR DIAGNOSIS OF GASTRIC DISORDERS**

J. T. Holen (McDonnell-Douglas Corp.)

Aug. 1972

**HQ-10767**

Motility and pH sensor capsule is developed to monitor gastric acidity, pressure, and temperature. Capsule does not interfere with digestion. Sensor is capsule which includes pH electrode, Pitran pressure transducer, and thermistor temperature sensor all potted in epoxy and enclosed in high density polyethylene sheath.

**B72-10533**

**PATIENT'S BREATH CONTROLS COMFORT DEVICES**

M. Schrader (Southwest Res. Inst.), B. Carpenter (Southwest Res. Inst.), and C. D. Nichols

Sep. 1972

**LANGLEY-11138**

Patient assist system for totally disabled persons was developed which permits a person, so paralyzed as to be unable to move, to activate by breathing, a call system to summon assistance, turn the page of a book, adjust his bed, or do any one of a number of other things. System consists of patient assist control and breath actuated switch.

**B72-10547**

**STERILE CHAMBER OPERATION WITH BIO-ISOLATOR SUIT SYSTEM**

R. M. Hueschen

Sep. 1972

**LANGLEY-11054**

Development and characteristics of protective suit to permit man to operate in biologically sterile environment are described. Construction of tunnel, flexible seals, and cooling system are analyzed. Illustration of isolation suit is provided.

**B72-10557**

**METERED OXYGEN SUPPLY AIDS TREATMENT OF DOMESTIC SEWAGE**

N. Weliky (TRW Systems Group), T. J. Hooper (TRW Systems Group), and H. P. Silverman (TRW Systems Group)

Sep. 1972 see also NASA-CR-73033

**ARC-10024**

Microbiological fixed-bed process was developed in which supplementary oxygen required by microbial species is supplied by electrochemical device. Rate of addition of oxygen to waste treatment process is controlled to maintain aerobic metabolism and prevent anaerobic metabolisms which produce odorous or toxic products.

**B72-10559**

**A THERMOCOUPLE THERMODE FOR SMALL ANIMALS**

B. A. Williams

Sep. 1972

**ARC-10550**

Thermode composed of two thin-walled stainless steel hypodermic needles and copper-constantan thermocouple or small thermistor to indicate temperature at point of perfusion is used to measure brain temperature in animals. Because of relatively small size of thermode, structural damage to brain is minimized.

**B72-10579**

**LOUDNESS (ANNOYANCE) PREDICTION PROCEDURE FOR STEADY SOUNDS**

W. L. Howes and E. A. LaSalvia

Oct. 1972 See also NASA-TM-X-2300

**LEWIS-11761**

Method has been devised to predict loudness level of any steady sound solely from its measured power spectrum level. Method is based on assumption that, with respect to loudness sensation, the human auditory system acts as open-loop transmission system with transmittance function determined from measured tone curves.

**B72-10588**

**TECHNICAL MANAGEMENT TECHNIQUES FOR IDENTIFICATION AND CONTROL OF INDUSTRIAL SAFETY AND POLLUTION HAZARDS**

R. Campbell, M. K. Dyer, E. G. Hoard, D. G. Little, and A. C. Taylor

Dec. 1972 See also NASA-TM-X-2567

**M-FS-21883**

Constructive recommendations are suggested for pollution problems from offshore energy resources industries on outer continental shelf. Technical management techniques for pollution identification and control offer possible applications to space engineering and management.

**B72-10617**

**Dc MOTOR PROPORTIONAL CONTROL SYSTEM FOR ORTHOTIC DEVICES**

H. T. Blaise and J. R. Allen (Rancho Los Amigos Hosp.)

Oct. 1972

**M-FS-21573**

Multi-channel proportional control system for operation of dc motors for use with externally-powered orthotic arm braces is described. Components of circuitry and principles of operation are described. Schematic diagram of control circuit is provided.

**B72-10630**

**TISSUE HOLDER FOR EXPERIMENTAL AND DEMONSTRATION SURGERY**

F. J. Kuchta, J. B. Pavlik, D. J. Vargo, and G. R. Winters

Nov. 1972

**LEWIS-11755**

Development of device for holding anatomical tissues during operations is discussed. Device consists of plastic dish with hemispherical recess in center to hold excised eyes. Low vacuum applied to underside of recess insures holding of part.

**B72-10632**

**A SYSTEM FOR AUTOMATIC ANALYSIS OF BLOOD PRESSURE DATA FOR DIGITAL COMPUTER ENTRY**

R. L. Miller

Nov. 1972 See also NASA-TM-X-2519

**LEWIS-11751**

Operation of automatic blood pressure data system is described. Analog blood pressure signal is analyzed by three separate circuits, systolic, diastolic, and cycle defect. Digital computer output is displayed on teletype paper tape punch and video screen. Illustration of system is included.

**B72-10637**

**AUTOMATIC AGAR TRAY INOCULATION DEVICE**

J. R. Wilkins and S. M. Mills

Oct. 1972

**LANGLEY-11074**

Automatic agar tray inoculation device is simple in design and foolproof in operation. It employs either conventional inoculating loop or cotton swab for uniform inoculation of agar

media, and it allows technician to carry on with other activities while tray is being inoculated.

**B72-10641  
QUICK-DONNING BACKPACK HARNESS**

D. F. Thomas, Jr.  
Dec. 1972

**LANGLEY-10102**

Harness device permits user to quickly put on or take off load carried in backpack arrangement. It can be attached with one hand; has controlled deformation belt that automatically encircles user upon application of pressure; has rigid shoulder harness elements which move automatically into place; and primary attachment components that cannot be displaced while harness is in place.

**B72-10642  
IMPROVED BIOMEDICAL ELECTRODE**

J. D. Frost, Jr. (Baylor Univ.)

Oct. 1972

**MSC-13648**

Newly designed electrode is prefilled, disposable, electrolyte-saturated sponge. New design permits long periods of storage without deterioration, and readiness in matter of seconds. Electrodes supply signals for electroencephalogram, electro-oculogram, and electrocardiogram.

**B72-10652  
SPEECH THERAPY AND VOICE RECOGNITION INSTRUMENT**

J. Cohen (Ill. Univ.) and M. L. Babcock (Ill. Univ.)

Oct. 1972

**HQ-10628**

Characteristics of electronic circuit for examining variations in vocal excitation for diagnostic purposes and in speech recognition for determining voice patterns and pitch changes are described. Operation of the circuit is discussed and circuit diagram is provided.

**B72-10653  
A PROCESS YIELDS LARGE QUANTITIES OF PURE RIBOSOME SUBUNITS**

M. Friedman (MIT), P. Lu (MIT), and A. Rich (MIT)

Oct. 1972

**HQ-10662**

Development of process for in-vitro protein synthesis from living cells followed by dissociation of ribosomes into subunits is discussed. Process depends on dialysis or use of chelating agents. Operation of process and advantages over previous methods are outlined.

**B72-10657  
BREATHING-METABOLIC SIMULATOR**

R. G. Bartlett (IBM), C. M. Hendricks (IBM), and W. B. Morison (IBM)

Oct. 1972 See also B72-10658; B72-10659; B72-10660;

B72-10661

**HQ-10766**

Breathing-metabolic simulator was developed to be used for evaluation of life support equipment. Apparatus simulates human breathing rate and controls temperature and humidity of exhaled air as well as its chemical composition. All functions are designed to correspond to various degrees of human response.

**B72-10658  
METABOLIC SIMULATION CHAMBER**

R. G. Bartlett (IBM) and C. M. Hendricks (IBM)

Oct. 1972 See also B72-10657; B72-10659; B72-10660;

B72-10661

**HQ-10776**

Metabolic simulation combustion chamber was developed as subsystem for breathing metabolic simulator. Entire system is used for evaluation of life support and resuscitation equipment. Metabolism subsystem simulates a human by consuming oxygen and producing carbon dioxide. Basic function is to simulate human metabolic range from rest to hard work.

**B72-10659**

**DRIVE MECHANISM FOR PRODUCTION OF SIMULATED HUMAN BREATH**

R. G. Bartlett (IBM), C. M. Hendricks (IBM), J. W. Lambert (IBM), and W. B. Morison (IBM)

Dec. 1972 See also B72-10657; B72-10658; B72-10660;

B72-10661

**HQ-10777**

Simulated breath drive mechanism was developed as subsystem to breathing metabolic simulator. Mechanism reproduces complete range of human breath rate, breath depth, and breath waveform, as well as independently controlled functional residual capacity. Mechanism was found capable of simulating various individual human breathing characteristics without any changes of parts.

**B72-10660  
TEMPERATURE AND HUMIDITY CONTROL OF SIMULATED HUMAN BREATH**

R. G. Bartlett (IBM) and C. M. Hendricks (IBM)

Dec. 1972 See also B72-10657; B72-10658; B72-10659;

B72-10661

**HQ-10778**

Subsystem was developed for breathing metabolic simulator which adjusts temperature and humidity of air to levels of human exhaled breath. Temperature-humidity subsystem is described, consisting of aluminum enclosure with 400 watt heat sheet glued to bottom, vertical separators, inlet connection, and check valve.

**B72-10661  
SIMULATED BREATH WAVEFORM CONTROL**

R. G. Bartlett (IBM), C. M. Hendricks (IBM), and W. B. Morison (IBM)

Dec. 1972 See also B72-10657; B72-10658; B72-10659;

B72-10660

**HQ-10779**

Subsystem was developed which provides twelve waveform controls to breath drive mechanism. Twelve position, magnetically actuated rotary switch is connected to one end of crankshaft drive, such that it makes one complete revolution for each simulated breath. Connections with common wired point are included in modifications made to standard motor speed controller.

**B72-10690  
AN EFFICIENT PREBREATHING APPARATUS FOR HUMANS DURING DECOMPRESSION**

J. R. Jaax and G. P. Mills (United Aircraft Corp.)

Dec. 1972

**MSC-14151**

Portable prebreathing system was developed which recirculates and reconditions respiratorily exhaled oxygen. Apparatus reduces fire hazards, simplifies prebreathing procedures, and does not require extensive enclosure venting system usage.

**B72-10695  
IMPROVED ULTRASONIC BIOMEDICAL MEASURING APPARATUS**

R. D. Lee

Dec. 1972

**ARC-10597**

Device for making measurements of organs in living specimens and recording movements of organs is described. System uses series of ultrasonic pulses beamed into body of animal. Reflected echo pulses are picked up by transducers and recorded. Diagram of equipment required and method of application is included.

**B72-10698  
IMPROVED ELECTRODES FOR SKIN CONTACTS**

J. G. Castle (Ala. Univ.) and R. R. Lattanzi (Ala. Univ.)

Dec. 1972

**M-FS-21926**

Design is described of thick, flexible electrodes with appropriate metal surfaces which prevent unnecessary skin motion. Electrodes provide sufficient radial pressure directed toward body

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surface to depress skin a noticeable portion of its normal resilient thickness.

### B72-10708

#### IMPLANTABLE DRUG THERAPY DEVICE: A CONCEPT

C. Feldstein

Dec. 1972

NPO-11934

Design is described of small, rechargeable, implantable infusor which contains fluid medicament stored under pressure and which dispenses fluid continuously through catheter. Body of infusor is covered by pliable silicone rubber sheath attached to suture pad for securing device.

### B72-10730

#### IMPROVED MEASUREMENT OF DEPTH PERCEPTION

R. C. Fitch and D. D. Miller (Technol. Inc.)

Dec. 1972

M-FS-14133

Electromechanical system for Howard-Dolman device was developed. System is used for human depth perception measurements without tactual stimuli.

### B72-10732

#### EFFECT OF THE METHOD OF PROCESS ON THE CONTROL

#### OF MICROBIAL GROWTH BY WATER ACTIVITY IN FOODS

T. P. Labuzu (MIT)

Dec. 1972

MSC-14234

Two methods for preparation of intermediate moisture foods (IMF) were investigated: water absorption and water desorption technique. Results indicate that shelf stability of IMP systems might be enhanced by preparing foods by rehumidifying dehydrated foods to optimum water activity rather than drying food to reduce the water activity.

### B72-10756

#### AUTOMATED ANALYSIS OF BLOOD PRESSURE MEASUREMENTS (KOROTKOV SOUND)

D. P. Golden (Technol., Inc.), G. W. Hoffer, and R. A. Wolthuis (Technol., Inc.)

Dec. 1972

MSC-13999

Automatic system for noninvasive measurements of arterial blood pressure is described. System uses Korotkov sound processor logic ratios to identify Korotkov sounds. Schematic diagram of system is provided to show components and method of operation.

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### B72-10009

#### ELECTRODYNAMIC ACTUATORS FOR ROCKET ENGINE VALVES

O. Fiet (TRW Systems Group) and D. Doshi (TRW Systems Group)

1972

ARC-10486

Actuators, employed in acoustic loudspeakers, operate liquid rocket engine valves by replacing light paper cones with flexible metal diaphragms. Comparative analysis indicates better response time than solenoid actuators, and improved service life and reliability.

### B72-10010

#### GYRO SPRING AUGMENTATION SYSTEM

H. D. Danielson (Lockheed-Calif. Co.) and A. W. Brandstetter (Lockheed-Calif. Co.)

1972

ARC-10496

Spring-loaded piston with provision for hydraulic control of spring action varies the stiffness of hydraulic control systems.

### B72-10011

#### FERROMAGNETIC-FLUID LOGIC DEVICES

M. J. Makowski (TRW Systems Group) and C. Mangion (TRW Systems Group)

1972

ARC-10503

Logic element switches flows of low pressure process control

fluid in fluidics assemblies. Device operates both electrically and fluidically and is controlled by passing permanent magnet or electromagnet over elements, thus providing proximity switching functions.

### B72-10012

#### CAVITATING VENTURI SUMP

C. Mangion (TRW Systems Group)

1972 See also NASA-CR-86435

ARC-10504

By ducting spent fluid into a cavitating Venturi sump formed in a main stream of propellant, hazardous working fluid of fluidic systems on board spacecraft or rockets is vented harmlessly.

### B72-10013

#### HERMETIC ISOLATION VALVES

M. J. Makowski (TRW Systems Group) and C. Mangion (TRW Systems Group)

1972

ARC-10505

Mechanism consists of thermal actuator, which expands when flow is desired, forcing cutter poppet through a diaphragm seal. Design concept is useful in systems that are stored for long periods of time before operation.

### B72-10022

#### WIND TUNNEL BUFFET LOAD MEASURING TECHNIQUE

C. S. Chang (Lockheed Missiles and Space Co.) and A. M. Ellison (Lockheed Missiles and Space Co.)

1972

ARC-10495

Indirect force measurement technique estimates unsteady forces acting on elastic model during wind tunnel tests. Measurement of forces is practically insensitive to errors in aeroelastic scaling between model and full-scale structure, simplifying design, fabrication and dynamic calibration.

### B72-10024

#### ZERO-LEAKAGE VALVES

R. J. Salvinski (TRW Systems Group)

1972

ARC-10506

Valve action confines polymeric material in a metal groove effecting seal by compressive reaction of the polymer. As cold flow does not occur, sealing material resiliency is preserved over numerous operations.

### B72-10037

#### SOLENOID-OPERATED SWING-CHECK VALVE

P. D. Quattrone and R. H. Meacham

1972

XAC-10048

Modification of spring-loaded swing-check valve for solenoid operation provides low-vacuum swing-check valve which can be operated remotely.

### B72-10040

#### REDUCTION OF FAN NOISE: A CONCEPT

M. R. Simonson (GE)

1972

ARC-10312

Acoustic materials strategically located within or near noise sources are effective for noise abatement on wing mounted lift fans, nozzles, engines and other noise sources. Panels are straightforward and easily adaptable to situations outside of aircraft technology.

### B72-10049

#### PRESSURE SENSITIVE GAS FLOW METER

C. E. Hallum (Philco-Ford Corp.)

1972 See also NASA-CR-73231

ARC-10219

Regulator, which increases flow area in discrete steps as upstream pressure falls, maintains steady flow rate of gas as the supply pressure from storage system decreases.

### B72-10075

#### GRAPH FOR LOCKED ROTOR CURRENT

R. R. Peck (N. Am. Rockwell Corp.)

1972

MSC-15703

Graph determines effect of stalled motor on a distribution system and eliminates hand calculation of amperage in emergencies. Graph is useful to any manufacturer, contractor, or maintenance department involved in electrical technology.

**B72-10078**  
**CONTINUOUS-FLOW VARIABLE-DENSITY WIND TUNNEL FACILITIES**

J. G. Herrera  
1972

**NPO-11287**

Unique features of wind tunnel facilities at Jet Propulsion Laboratory permit variety of conventional and novel tests to be performed at supersonic and hypersonic speeds. Facilities and operations are described.

**B72-10084**  
**OPTIMIZED BRAKING OF LANDING VEHICLES WITH ATMOSPHERIC DRAG**

A. K. Bejczy  
1972

**NPO-11402**

Decelerating effect of atmospheric drag assures minimum fuel consumption and time expenditure during braking for soft landing.

**B72-10093**  
**COMPENSATING SUBREFLECTOR FOR TWO-REFLECTOR ANTENNAS: A CONCEPT**

D. A. Bathker, M. S. Katow, and P. D. Potter  
1972

**NPO-11503**

Segmented subreflector surface of Cassegrainian antenna is distorted and shaped by mechanical means to compensate for loss of figure in main reflector. Number of segments necessary is determined by gravity distortion pattern of main reflector at zenith and at horizon.

**B72-10097**  
**SQUIB-ACTUATED DISCONNECT DEVICE**

D. P. Davis  
1972

**NPO-11544**

Piston-operated device retains gases released by explosive squibs during stage separation of a spacecraft.

**B72-10104**  
**REMOVAL OF FILLER MATERIAL FROM LARGE HIGH ENERGY FORMED PARTS**

D. E. Krantz (N. Am. Rockwell Corp.), G. W. Wine (N. Am. Rockwell Corp.), and J. S. Corral (N. Am. Rockwell Corp.)  
1972

**M-FS-16326**

Filler material is removed by applying steam heat at 88.99 C to underside of workpiece and allowing filler to melt and drain from the waffle grids.

**B72-10105**  
**MICRORESONATOR FOR DAMPING FLOW OSCILLATIONS**

E. Bramblett (Rocketdyne)

May 1972

**M-FS-18401**

Resonant spring-mass system detunes flow oscillations of pump's inlet line to prevent structural damage in fluidic system.

**B72-10121**  
**MICRO REGULATING BALL VALVE**

J. W. Hawkins  
1972

**ARC-10295**

Ball valve of simple, rugged configuration overcomes leakage because there are no critical wear areas. Design has stable and precise calibration. Device can be assembled or disassembled in seconds and needs no lubrication.

**B72-10133**  
**POSITIVE FAST SEALING UNION CONNECTIONS**

C. M. Kleber  
Dec. 1972

**LEWIS-11290**

Union connections are designed for connecting high pressure flexible hoses from gas storage manifolds to gas transport trailers. Connection uses O ring seals which can be quickly assembled and disassembled without use of wrenches; and which do not twist hose. Worn or damaged O rings are easily replaced.

**B72-10135**  
**BOILER FOR GENERATING HIGH QUALITY VAPOR**

V. H. Gray, P. J. Marto, and A. W. Joslyn

May 1972 See also NASA-TN-D-4136; NASA-TN-D-6307

**LEWIS-11345**

Boiler supplies vapor for use in turbines by imparting a high angular velocity to the liquid annulus in heated rotating drum. Drum boiler provides a sharp interface between boiling liquid and vapor, thereby inhibiting the formation of unwanted liquid droplets.

**B72-10158**  
**FLUIDIC IGNITION DETECTION**

C. S. Henry (Aerojet Liquid Rocket Co.)  
Jul. 1952.

**M-FS-21498**

Ignition sensor, utilizing fluidic oscillator device and its ability to react to flow system's molecular weight and temperature changes, detects propellant ignition. Commercial applications include fields of fire protection equipment and fluidics.

**B72-10162**  
**FLUIDIC PRESSURE REGULATORS**

C. Mangion (TRW Systems Group) and W. Miller (TRW Systems Group)  
1972

**ARC-10474**

Three basic areas for possible application of fluidic control to rocket engine subsystems were identified and six subsystem configurations were analyzed for study. Results provide indication of tradeoffs involved between conventional and fluidic regulators and should be of interest to control and applications engineers who need to make similar analyses.

**B72-10163**  
**CLOSED-CYCLE POWER SUPPLY FOR FLUIDIC CONTROL SYSTEMS**

O. Fiet (TRW System Group) and C. Mangion (TRW Systems Group)  
1972

**ARC-10480**

Power supply utilizes small quantities of two-phase fluid of suitable thermodynamic properties for circulation in a capillary-pumped heat transfer loop. Fluid is vaporized in evaporator, passed through fluidic system load, condensed, pumped by multistage capillary pump, and returned to the evaporator.

**B72-10183**  
**ANGULAR VELOCITY AND ACCELERATION METER**

L. Melamed  
May 1972

**LEWIS-11466**

Meter uses a liquid crystalline film which changes coloration due to shear-stresses produced by a rotating disk. Device is advantageous in that it is not subject to bearing failure or electrical burnouts as are conventional devices.

**B72-10204**  
**A PIEZOELECTRICALLY ACTUATED BALL VALVE**

L. R. Erwin (Bendix Corp.), H. W. Schwartz (Bendix Corp.), and B. R. Teitelbaum (Bendix Corp.)  
May 1972

**ARC-10338**

Bimorph strip composed of two layers of poled piezoelectric ceramic material closes and opens valve. Strip performs like

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capacitor, allowing initial inrush of current when valve is energized and then only small leakage current flows as valve remains energized.

### B72-10210

#### TWO-STAGE COAXIAL GAS COMPRESSOR

W. S. Wang (TRW Systems Group), H. W. Wright, Jr. (TRW Systems Group), and S. Huniu (TRW Systems Group)  
May 1972

### ARC-10426

Compressor raises pressure of gases from low ambient supply during space experiments by a system of low weight, size, and power input. Dc rotary-torque motor and ball-screw drive shaft activate first and second stage of compressor, utilizing inertia forces to operate check valves.

### B72-10213

#### INTEGRATED FLIGHT CONTROLLER FOR LIGHT AIRCRAFT

J. W. Olcott (Aeron. Res. Associates of Princeton, Inc.), D. R. Ellis (Aeron. Res. Associates of Princeton, Inc.), and E. Seckel (Aeron. Res. Associates of Princeton, Inc.)

May 1972

### ARC-10456

Controller-throttle engages spoiler/dive brake system when throttle setting is below a fixed power setting and gradually increases effect of spoiler/dive brake as throttle is moved toward idle position; since action is automatically reversible, a sudden application of power abruptly terminates aerodynamic effects of spoiler/dive brake system.

### B72-10228

#### SIMPLE, REPRODUCIBLE METHODS FOR THERMAL SHOCK TESTING OF BRITTLE MATERIALS

J. C. Rowley and C. R. King

May 1972

### NUC-11020

Technique requires radio frequency induction power source, induction furnace and good vacuum system to induce brittle material thermal shock testing.

### B72-10239

#### ENERGY ABSORBER USES EXPANDED COILED TUBE

E. F. Johnson

Dec. 1972

### AEC-10044

Mechanical shock mitigating device, based on working material to its failure point, absorbs mechanical energy by bending or twisting tubing. It functions under axial or tangential loading, has no rebound, is area independent, and is easy and inexpensive to build.

### B72-10241

#### FERROFLUIDIC SOLENOID WITH AXIAL AND RADIAL DISPLACEMENT

E. E. Sabelman

Aug. 1972

### NPO-11738

New design is proposed for ferrofluidic solenoid with low magnetic flux leakage. Solenoid consists of a coil centered within a football-shaped elastomeric capsule filled with a ferromagnetic fluid. Fluid replaces the solid, movable core of conventional solenoids, and elastomeric capsule acts as return spring.

### B72-10250

#### FLUIDIC SYSTEMS MAY IMPROVE COMBUSTION IN AUTOMOTIVE ENGINES

C. Mangion (TRW Systems Group)

Sep. 1972

### ARC-10582

Application of fluidic devices to reduce generation of noxious exhausts from internal combustion engines is discussed. Operation of fluidic system to provide bypass of fuel air mixture into heated loop to provide more complete combustion is explained. Advantage lies in no moving parts required for fluidic by-pass action.

### B72-10258

#### REPEATABLE METHOD OF THERMAL STRESS FRACTURE TEST OF BRITTLE MATERIALS

J. C. Rowley, R. W. Andrae, and A. E. Carden

Jun. 1972

### NUC-11019

Method heats specimens slowly and with sufficient control so that the critical temperature gradient in the specimens cannot occur before temperature equilibrium is reached.

### B72-10289

#### FLOW EQUATION FOR POROUS PLUG AND CAPILLARY TUBE FLOW RESTRICTORS

W. S. Davis (Avco Corp.)

Jun. 1972

### GSFC-11387

Development of flow measuring apparatus for determining low flow performance of resistojet thruster is discussed. Diagram of test equipment is presented. Operation of test equipment is described and numerical relationships are explained.

### B72-10323

#### ISOGRID STRUCTURE

R. R. Meyer (McDonnell-Douglas Corp.)

Jul. 1972

### M-FS-21567

Isotropic rib stiffened shell whose ribs intersect to form equilateral triangles has advantages of high twisting rigidity of construction and simplicity of triangular pattern.

### B72-10330

#### LIQUID METHANE GELLED WITH METHANOL AND WATER REDUCES RATE OF NITROGEN ABSORPTION

E. M. Vanderwall (Aerojet Liquid Rocket Co.)

Jul. 1972 See also NASA-CR-72876

### LEWIS-11574

Dilution of gelant vapor with inert carrier gas accomplishes gelation. Mixture is injected through heated tube and orifice into liquid methane for immediate condensation within bulk of liquid. Direct dispersion of particles in liquid avoids condensation on walls of vessel and eliminates additional mixing.

### B72-10331

#### SMALL TURBINE-TYPE FLOWMETERS FOR LIQUID HYDROGEN

I. Warshawsky, H. F. Hobart, and H. L. Minkin

Jul. 1972 See also NASA-TM-X-52984

### LEWIS-11535

Characteristics of turbine-type flowmeters in two sizes and with various types of bearings are presented. Calibration procedures of instruments are described. Accuracies obtainable under various conditions are analyzed.

### B72-10338

#### PORTABLE ELECTRON BEAM WELD CHAMBER

J. R. Lewis (N. Am. Rockwell Corp.) and J. M. Dimino (N. Am. Rockwell Corp.)

Sep. 1972

### MSC-17738

Development and characteristics of portable vacuum chamber for skate type electron beam welding are discussed. Construction and operational details of equipment are presented. Illustrations of equipment are provided.

### B72-10380

#### EXPANDABLE COATING COCOON LEAK DETECTION SYSTEM

R. L. Hauser (Hauser Labs.) and M. C. Kochansky (Hauser Labs.)

Jul. 1972

### M-FS-21848

Development of system and materials for detecting leaks in cocoon protective coatings is discussed. Method of applying materials for leak determination is presented. Pressurization of system following application of materials will cause formation of bubble if leak exists.

**B72-10381****LEAK DECAY METHOD OF HELIUM BOMBARDMENT LEAK TESTING**

W. P. Garton (N. Am. Rockwell Corp.)

Jul. 1972

**M-FS-24109**

Method for verifying hermetic seal quality of small components is described. Procedure for using helium bombardment and examination with mass spectrometer is described. Technique eliminates errors in seal quality determination and checks quality of seals without contaminating products.

**B72-10399****IMPROVEMENTS OF ZEYDED METHOD FOR CALCULATING FLUTTER OF FLAT PANELS**

J. E. Yates (Aeron. Res. Associates of Princeton, Inc.)

Jul. 1972

**M-FS-20955**

Method for calculating flutter boundaries and estimating stresses in infinite spanwise array of panels is presented. Numerical analyses are included for pinned edge panels, isotropic panel material, zero viscous damping, and no elastic foundation. Design flutter boundaries are presented for aluminum panels on Saturn spacecraft trajectory.

**B72-10403****NONSTEADY FLOW-DIRECTION MEASUREMENT**

L. N. Krause and R. L. Summers

Jul. 1972 See also NASA-TM-X-52962

**LEWIS-11499**

Nonsteady flow probe uses miniature pressure transducers mounted within probe support very close to tube inlets. Response speed depends on internal volume between tube inlet and pressure transducer location.

**B72-10407****PREDICTION OF FLOW-INDUCED FAILURES OF BRAIDED FLEXIBLE HOSES AND BELLOWES**

L. E. Sack (N. Am. Rockwell Corp.), R. L. Nelson (N. Am. Rockwell Corp.), D. R. Mason (N. Am. Rockwell Corp.), and R. A. Cooper (N. Am. Rockwell Corp.)

Jul. 1972

**M-FS-19004**

Analytical techniques were developed to evaluate braided hoses and bellows for possibility of flow induced resonance. These techniques determine likelihood of high cycle fatigue failure when such resonance exists.

**B72-10408****TURBOPUMP THERMODYNAMIC COOLING**

T. C. Patten (McDonnell-Douglas Corp.) and H. B. McKee (McDonnell-Douglas Corp.)

Jul. 1972

**M-FS-21597**

System for cooling turbopumps used in cryogenic fluid storage facilities is described. Technique uses thermodynamic propellant vent to intercept pump heat at desired conditions. Cooling system uses hydrogen from outside source or residual hydrogen from cryogenic storage tank.

**B72-10436****RIGHT ANGLE MOUNTED COLD TRAP**

R. J. Ugiansky

Jul. 1972

**GSFC-11323**

Vacuum system for calibrating, aligning, and evaluating solar research instruments is described. Equipment consists of right-angle mounted cold trap connected to side pumping vacuum system. Operation of test facility and conditions obtainable in test chamber are discussed.

**B72-10437****INVESTIGATIONS OF A TURBULENT JET IN A CROSSFLOW**

Y. Kamotani (Case Western Reserve Univ.) and I. Greber (Case Western Reserve Univ.)

Jul. 1972 See also NASA-CR-72893

**LEWIS-11680**

Analyses of flow field downstream of jet directed at right angles into crossflow for heated and unheated single jets are presented. Application of flow data to cooling system for gas turbine combustion chambers is discussed. Temperature distribution, velocity trajectory, and vortex motion are described.

**B72-10441****MULTIPLE REACTION MASS AND ISOLATION SYSTEM**

N. F. Jacobson (N. Am. Rockwell Corp.)

Jul. 1972

**M-FS-24119**

System allows measurement of damping and stiffness with the desired uncoupling of measurement fixture and permits testing of large structures without need for costly foundation or base. System is designed to permit horizontal loading to be conveniently superimposed on vibratory loads.

**B72-10446****COMBINATION PRESSURE REGULATOR AND SAFETY VALVE: A CONCEPT**

R. L. Acres (Serv. Technol. Corp.)

Jul. 1972

**MSC-14088**

Device for regulating high pressure liquefied gas to high pressure vapor generator using liquid oxygen is described. System includes pressure regulation and safety valve features. Construction of the equipment and method of operation are presented.

**B72-10466****CONSTANT TENSION DEVICE FOR GRAVITY SIMULATION**

W. F. Orłowski (Sperry Rand Corp.)

Aug. 1972

**M-FS-21618**

Mechanical device for simulating lunar gravitation is described. Details of construction are illustrated and example of application is provided. Device works opposite to effects of earth gravity and produces effects similar to lunar conditions by providing mechanical lifting forces.

**B72-10476****IMPACT SENSITIVITY OF MATERIALS IN CONTACT WITH LIQUID AND GASEOUS OXYGEN AT HIGH PRESSURE**

R. J. Schwinghamer

Dec. 1972

**M-FS-21930**

Tests run at high pressure indicate that various polymer materials used show inverse relationship between thickness and impact sensitivity. Several materials tested exhibited greater impact sensitivity in gaseous oxygen than in liquid oxygen. Materials tested in gaseous oxygen showed enhanced impact sensitivity with higher pressure.

**B72-10488****ANALYTICAL FAILURE DETERMINATION OF FLOW-INDUCED FATIGUE IN BELLOWES**

R. G. Cron (Rocketdyne)

Aug. 1972

**M-FS-18178**

Fatigue failure of bellows when subjected to passage of fluids at high speeds is discussed. It is assumed that flow through bellows generates sound in fluid and vibration caused by sound waves is principal contributor to failure. Effects of sound waves on bellows structure are analyzed.

**B72-10489****IMPROVED HIGH-TEMPERATURE GIMBAL JOINT**

J. R. Winemiller, S. T. Yee, and B. H. Neal

Aug. 1972

**LEWIS-11705**

Development and characteristics of bellows gimbal joint for reduction of thermal stress effects are discussed. Reactions of designed joint to changes in temperature are described. Illustrations of conventional gimbal joint and improved gimbal joint are provided.



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### **B72-10490 AUTOMATIC AIR FLOW CONTROL IN AIR CONDITIONING DUCTS**

H. D. Obler  
Aug. 1972  
**GSFC-11445**

Device is designed which automatically selects air flow coming from either of two directions and which can be adjusted to desired air volume on either side. Device uses one movable and two fixed scoops which control air flow and air volume.

### **B72-10494 A SYSTEM FOR EARLY WARNING OF BEARING FAILURE** J. J. Broderick (Mech. Technol., Inc.), R. F. Burchill (Mech. Technol., Inc.), and H. L. Clark (Mech. Technol., Inc.) Aug. 1972 **M-FS-21877**

System for detecting incipient failure in ball bearings is described. Ultrasonic equipment detects bearing system resonance and provides warning signal through electronic circuitry. Detector can be used to evaluate performance of newly installed bearings. Schematic diagram is provided to show components.

### **B72-10496 DRY ICE PLUG FOR HYDRAULIC AND PNEUMATIC PIPE FLUSHING** L. Francino (Grumman Aerospace Corp.) and S. Rauch (Grumman Aerospace Corp.) Aug. 1972 **MSC-12548**

Development of technique to clear blockages in hydraulic and pneumatic pipes is discussed. Technique consists of using dry ice plug to separate sensitive components from flushing fluid. Diagram of equipment and principles of operation are presented.

### **B72-10502 INTEGRATED MONOPROPELLANT THRUSTER** C. Mangion (TRW Systems Group) Aug. 1972 **NPO-12004**

Application of vortex amplifier principles to throttling of monopropellant thrusters is described. Integration of flow control, catalyst bed, and thruster nozzle is accomplished by design of thruster. Diagrams of thrusters are provided to show details of construction and operation.

### **B72-10540 IMPROVED SAMPLING OF COMPRESSED GASES FOR CONDENSABLE HYDROCARBON CONTENT** M. H. Peterson (Bendix Corp.) and E. W. Fickey (Bendix Corp.) Sep. 1972 **KSC-10304**

Sampling process was developed which uses commercially available high pressure filters and provides measurements in fraction of time required by older methods. Measurements show no significant difference in results between low pressure and high pressure samples. Filter method is slightly more accurate than scrubber technique.

### **B72-10543 A STAGNATION PRESSURE PROBE FOR USE IN SUPER- SONIC FLOW** M. J. Goodyer Sep. 1972 **LANGLEY-11139**

Probe was developed which is capable of recording true stagnation pressure in supersonic and subsonic flows. Static pressure orifices in the compression surface allow probe to be used as combined flow direction and stagnation pressure sensor.

### **B72-10546 PROBE MEASURES GAS AND LIQUID MASS FLUX IN HIGH MASS FLOW RATIO TWO-PHASE FLOWS** R. J. Burick (N. Am. Rockwell Corp.) Sep. 1972 See also NASA-CR-120819 **LEWIS-11270**

Deceleration probe constructed of two concentric tubes with separator inlet operates successfully in flow fields where ratio of droplet flow rate to gas flow rate ranges from 1.0 to 20, and eliminates problems of local flow field disturbances and flooding. Probe is effective tool for characterization of liquid droplet/gas spray fields.

### **B72-10552 MICRO-SCALE CREASE-AND-FOLD APPARATUS** R. F. Muraca (Stanford Res. Inst.) and J. Neff (Stanford Res. Inst.) Oct. 1972 **NPO-12029**

Crease and fold resistance of polymeric films and test equipment for determining mechanical properties is discussed. Components of equipment and method of operation are described. Illustration of test device is provided.

### **B72-10558 RESTRAINT AND LOCOMOTION AID** H. C. Vykukal Sep. 1972 **ARC-10153**

Design of system to permit human performance in conditions where gravity and friction forces cannot act as counterforces is described. Application of system to performance of work in space is discussed. Diagram is provided to show construction and operation of equipment.

### **B72-10576 LEAK TEST SYSTEM** R. G. Morris (McDonnell-Douglas Corp.) and A. L. Rose (McDonnell-Douglas Corp.) Sep. 1972 **M-FS-21788**

System for quantitative determination of leak rates in large pressurized compartments is described. Method uses pressure reference cylinder placed in thermal contact with internal environment of compartment. Construction of equipment and details of operational procedure are reported. Illustration of equipment is included.

### **B72-10581 IMPROVED SILVER-ZINC BATTERY-TERMINAL SEALS** W. E. Snider, D. W. Medwid, and W. J. Nagle Sep. 1972 See also NASA-TM-X-68067 **LEWIS-11615**

Development of battery terminal seal for sealing electrolyte for periods of three to five years is discussed. Operating conditions of battery are defined. Components of electrolyte seal and method of production are reported. Schematic diagrams of device are included.

### **B72-10590 HIGH PRESSURE LIQUID GAS PUMP** R. L. Acres (Serv. Technol. Corp.) Sep. 1972 **MSC-14087**

Design and development of two types of pumps for handling liquefied gases are discussed. One pump uses mechanical valve shift and other uses pneumatic valve shift. Illustrations of pumps are provided and detailed description of operation is included.

### **B72-10598 THERMAL INDUCED FLOW OSCILLATIONS IN HEAT EXCHANGERS FOR SUPERCRITICAL FLUIDS** J. C. Friedly (GE), J. L. Manganaro (GE), and P. G. Krueger (GE) Sep. 1972 **M-FS-21262**

Analytical model has been developed to predict possible unstable behavior in supercritical heat exchangers. From complete model, greatly simplified stability criterion is derived. As result of this criterion, stability of heat exchanger system can be predicted in advance.

**B72-10603**  
**RESPONSE OF A PANEL STRUCTURE TO REVERBERANT ACOUSTIC EXCITATION**

D. Cadin, Jr. (Lockheed Missiles and Space Co.)  
 Dec. 1972

**M-FS-21774**

Investigation was made of methods for predicting response of panel structures to acoustic excitation. Computer program was generated to calculate response of panel to reverberant acoustic field, using normal mode approach developed for low frequency response. Program can be modified to handle other types of acoustic fields by changing spatial correlation calculation.

**B72-10613**  
**A FOUR-PANEL ENCLOSURE PROTECTS FROM EXPLOSION**

P. V. King (GE)  
 Oct. 1972

**M-FS-21847**

Development of multi-layered baffle as enclosure to protect personnel from effects of explosion during production of ammunition is discussed. Advantages of new system over previous systems are described. Illustration of typical panel structure is provided.

**B72-10615**  
**SOLAR POWERED ABSORPTION CYCLE HEAT PUMP USING PHASE CHANGE MATERIALS FOR ENERGY STORAGE**

R. L. Middleton  
 Oct. 1972

**M-FS-21927**

Solar powered heating and cooling system with possible application to residential homes is described. Operating principles of system are defined and illustration of typical energy storage and exchange system is provided.

**B72-10626**  
**INTERNAL CAPILLARY INSULATION FOR CRYOGENIC TANKS**

J. L. McGrew (Martin Marietta Corp.)  
 Nov. 1972

**LEWIS-11234**

Capillary-type insulation was devised for installation on inside of liquid methane fuel tanks for future aircraft. Insulation consists of honeycomb core of fiberglass cloth impregnated with polyimide resin which is bonded onto metal tank wall using polyimide adhesive. Capillary holes in each honeycomb cell admit methane which provides static pressure in cell.

**B72-10631**  
**USE OF SMALL TURBINE-TYPE FLOWMETERS TO MEASURE FLOW IN LARGE PIPES**

H. L. Minkin and H. F. Hobart  
 Nov. 1972

**LEWIS-11851**

Measurement of mass flow in large pipes using small turbine-type flowmeters is discussed. Experiments for determining accuracy of flowmeter and applicability to various types of flow measurement are reported. Illustration of turbine flowmeter and calibration curve are included.

**B72-10636**  
**LINEAR ACCELERATOR: A CONCEPT**

J. Mutzberg (Boeing Co.)  
 Oct. 1972

**KSC-10618**

Design is proposed for inexpensive accelerometer which would work by applying pressure to fluid during acceleration. Pressure is used to move shuttle, and shuttle movement is sensed and calibrated to give acceleration readings.

**B72-10651**  
**FREON 21 BEARING LUBRICATION AND COOLANT SYSTEM**

E. J. Bodensieck (N. Am. Rockwell Corp.) and M. J. Gustafson

(N. Am. Rockwell Corp.)

Dec. 1972

**HQ-10302**

Lubrication and cooling of turbopump rotor bearings by liquid Freon 21 is reported. Freon expands in rotor bearing and acts as heat sink by removing heat during warming and evaporation. Gaseous Freon is removed by vacuum pump controlling rotor chamber operation.

**B72-10663**  
**AUTOMATIC WATER INVENTORY, COLLECTING, AND DISPENSING UNIT**

J. B. Hall, Jr. and E. F. Williams  
 Dec. 1972

**LANGLEY-11071**

Two cylindrical tanks with piston bladders and associated components for automatic filling and emptying use liquid inventory readout devices in control of water flow. Unit provides for adaptive water collection, storage, and dispensation in weightless environment.

**B72-10669**  
**SPRAG SOLENOID BRAKE**

P. H. Dane  
 Oct. 1972

**M-FS-21846**

Operation of solenoid braking mechanism is discussed. Illustrations of construction of the brake are provided. Device is used for braking low or medium speed shaft rotations and produces approximately ten times braking torque of similar solenoid brakes.

**B72-10677**  
**PROPELLANT FEED SYSTEMS TRANSIENTS**

R. A. Shumway (N. Am. Rockwell Corp.) and G. R. Cox (N. Am. Rockwell Corp.)

Dec. 1972

**MSC-17848**

Program was written to assist in analysis of fluid feed line transients initiated by operation of valves. Program output consists of printout of transient pressures and velocities through feed system as function of time. Optional CRT plot output provides for display of transient pressures and velocities as function of time at any desired location in feed system.

**B72-10679**  
**A MONOSTRAIN TEST APPARATUS**

J. C. Helf (N. Am. Rockwell Corp.), W. L. Hill (N. Am. Rockwell Corp.), and H. L. Pontius (N. Am. Rockwell Corp.)

Dec. 1972

**M-FS-24221**

Test apparatus is designed for determining tensile strength, modulus of elasticity, elongation, and thermal coefficient of contraction or expansion of uniformly shaped plastics, adhesives, and foam materials over temperature range of 700 to 90 K (800 to -300). Tests may be used in design quality control, and in evaluation of new adhesives and plastic materials.

**B72-10686**  
**AN OPTICAL QUALITY METER SUITABLE FOR CRYOGENIC LIQUIDS**

H. F. Hobart and H. L. Minkin

Oct. 1972 See also B66-10394

**LEWIS-11814**

Construction of instrument to measure ratio of liquid to gas of flowing transparent cryogenic fluid is described. Instrument consists of collimated light source and photoconductive cell. Operation of instrument is described and illustration of equipment is provided.

**B72-10689**  
**NEW DETECTION METHOD FOR ROLLING ELEMENT AND BEARING DEFECTS**

R. F. Burchill (Mech. Technol., Inc.) and J. L. Freary (Mech. Technol., Inc.)

Oct. 1972

**M-FS-21911**

## 06 MECHANICS

Instrument for detecting defects in rolling elements of bearings is described. Detection depends on rate at which rolling elements impact defect and establish envelope amplitude of ball resonant frequency. Block diagram of instrument is provided and results obtained in conducting tests are reported.

**B72-10692**

### **SEAT BELT RESTRAINT SYSTEM**

A. Garavaglia and D. Matsuhira

Oct. 1972

**ARC-10519**

Shoulder-harness and lap-belt restraint system was designed to be worn by individuals of widely different sizes and to permit normal body motion except under sudden deceleration. System is divided into two basic assemblies, lap belt and torso or shoulder harness. Inertia-activated reels immediately lock when seat experiences sudden deceleration.

**B72-10693**

### **EJECTOR NOZZLE WITH MASSIVE BLOWING**

H. C. True (Boeing Co.)

Oct. 1972

**ARC-10621**

Jet-flap, wing-blowing system for use in short takeoff and landing aircraft is described. System depends on ejector nozzle with large blowing capacity to direct ducted air against deflected flap. Operation of equipment during takeoff and cruise conditions is discussed. Diagrams of equipment are provided.

**B72-10704**

### **CONCENTRIC-SEATING POPPET**

W. F. MacGlashan, Jr.

Oct. 1972

**NPO-11658**

Configuration of poppet valve with zero clearance sudden initial contact is described. Detailed description of valve operation is presented and diagram of components is illustrated.

**B72-10712**

### **ENERGY ABSORBING SYSTEM FOR MECHANICAL IMPACTS**

E. R. Collins, Jr.

Dec. 1972

**NPO-10671**

System is described based on use of arrangement of crushable hollow spheres bonded together in layers of progressively different diameter, with largest diameter spheres positioned to receive impact forces initially. System is particularly useful for delivery of payloads by air-drop techniques.

**B72-10713**

### **SQUIB-OPERATED DISCONNECT**

P. Alexander, Jr. and A. R. McDougal

Dec. 1972

**NPO-11330**

Disconnect device is described, which consists of stud with enlarged end held in collet locked by pins, which are held in place by piston. When squib is fired, trapped combustion products force piston to release pins.

**B72-10714**

### **TRIANGULAR WHEEL LOCOMOTION MECHANISM**

E. Hryniewiecki (Comprehensive Designers, Inc.)

Dec. 1972

**NPO-11366**

Triangular wheel and suspension vehicle is described which can scale obstacle higher than its own length.

**B72-10715**

### **DESIGN CRITERIA MONOGRAPH ON SOLID ROCKET MOTOR IGNITERS**

Innovator not given (Lewis Res. Center) Dec. 1972 See also NASA-SP-8051

**LEWIS-11826**

Summary of large and loosely organized body of existing

successful design techniques and practices for solid rocket motor igniters is presented.

**B72-10716**

### **A MULTIELEMENT PROBE FOR COINCIDENT TEMPERATURE AND PRESSURE MEASUREMENTS**

G. E. Glawe, T. J. Dudzinski, and L. N. Krause

Dec. 1972 See also NASA-TM-X-2577

**LEWIS-11775**

Small, multielement probes are described which measure total pressure and temperature coincidentally at one or several points in gas stream.

**B72-10722**

### **OPTIMIZATION OF FLUID LINE SIZES WITH PUMPING POWER PENALTY IBM-360 COMPUTER PROGRAM**

D. Jelinek (N. Am. Rockwell Corp.)

Dec. 1972

**MSC-17930**

Computer program has been developed to calculate and total weights for tubing, fluid in tubing, and weight of fuel cell power source necessary to power pump based on flow rate and pressure drop. Program can be used for fluid systems used in any type of aircraft, spacecraft, trucks, ships, refineries, and chemical processing plants.

**B72-10723**

### **THERMAL-POWERED RECIPROCATING PUMP**

E. E. Sabelman

Dec. 1972

**NPO-11417**

Waste heat from radioisotope thermal generators in spacecraft is transported to keep instruments warm by two-cylinder reciprocating pump powered by energy from warm heat exchange fluid. Each cylinder has thermally nonconductive piston, heat exchange coil, and heat sink surface.

**B72-10733**

### **A PROPOSED REMOTE MANIPULATOR SYSTEM: A CONCEPT**

S. Brodie (Martin Marietta Corp.), C. Flatau (Martin Marietta Corp.), and F. Greb (Martin Marietta Corp.)

Dec. 1972

**MSC-14245**

System is described with variable ratio, mixed mode, bilateral, master-slave control. Manipulator arms consist of shoulder and elbow with two degrees of freedom, a wrist with three degrees of freedom, and terminal grasping device. Feedback is provided by TV cameras attached near shoulder, grasping device, and at end of shuttle opposite arm.

**B72-10738**

### **EXPERIMENTAL STUDY OF FLOW DISTRIBUTION WITH CIRCUMFERENTIAL MANIFOLDS**

R. T. Dittrich

Dec. 1972 See also NASA-TN-D-6697

**LEWIS-11649**

Water flow test results on fluid flow distribution and pressure loss in curved manifolds with tangential or radial entry are reported. Manifolds were studied both as inlet and outlet manifolds. Manifolds can be used for boilers and/or heat exchangers for advanced space electric power plants.

**B72-10743**

### **REDUCTION OF NOISE IN GYRO OUTPUTS**

G. M. Kraus (Honeywell, Inc.) and J. G. Rupert (Honeywell, Inc.)

Dec. 1972

**NPO-11603**

Technique is described to reduce extraneous gyro output signals by using relatively inexpensive shrouds which do not increase power consumption. Shrouds reduce noise by minimizing mass of gas spinning with rotor, reducing Reynolds number near rotor, and inducing laminar flow.

**B72-10748**

### **FINAL REPORT ON A STUDY OF LOW-DENSITY NOZZLE**

# **FLOWS, WITH APPLICATION TO MICROTHRUST ROCKETS**

Innovator not given (Cornell Aeron. Lab., Inc.) Dec. 1972  
**HQ-10761**

Method for predicting nozzle performance of microthrust rockets is discussed. Method is numerical and uses simplified computer program on IBM 360/65 computer. Analysis is based on slender channel equations with slip boundary conditions at walls. Implicit finite difference scheme is used to calculate pressure and velocity profiles along channel.

**B72-10749**

# **EFFECTS OF NONUNIFORM SWASH-PLATE STIFFNESS ON COUPLED BLADE-CONTROL SYSTEM DYNAMICS AND STABILITY**

V. J. Piarulli (Rochester Appl. Sci. Associates, Inc.)  
 Dec. 1972

**LANGLEY-11068**

Program has been developed that analytically determines effects of nonuniform swash-plate support stiffness, swash-plate flexibility, and out-of-blade track on vibratory mechanical stability characteristics of helicopter rotor systems. Analysis is based on combined Laplace transform and associated matrix approach.

## **07 MACHINERY, EQUIPMENT AND TOOLS**

**B72-10036**

# **OPTICAL ALIGNMENT OF ELECTRODES ON ELECTRICAL DISCHARGE MACHINES**

A. G. Boissevain and B. W. Nelson  
 1972

**XAC-09489**

Shadowgraph system projects magnified image on screen so that alignment of small electrodes mounted on electrical discharge machines can be corrected and verified. Technique may be adapted to other machine tool equipment where physical contact cannot be made during inspection and access to tool limits conventional runout checking procedures.

**B72-10066**

# **POSITION INDICATING, ROTATING BOOM**

A. C. Dibble, F. W. Gibson, J. R. Padelt, and W. S. Saunders  
 Dec. 1972

**LANGLEY-11202**

Universal multiplanar position indicating, rotating boom for mounting various instruments or sensors is described. Boom is telescoping, and apparatus is capable of 3 types of rotation controlled by electric motors. Movement may be continuous or incremental.

**B72-10095**

# **TUBING CUTTER**

A. Giandomenico  
 1972

**NPO-11524**

Replacement of opposing smooth rollers with appropriately grooved rollers in manual tubing cutter allows smooth severance of tubing of different diameters and eliminates raised lip around cut end.

**B72-10110**

# **HYDRAULIC VALVE LIFTER REMOVER**

R. F. Horton  
 Jul. 1952

**M-FS-21377**

Threaded rod, mounted in tubular housing which is flanged and expandable at one end, removes valve lifter after removal of valve covers and push rods.

**B72-10114**

# **HIGH SPEED, SELF-ACTING, FACE-CONTACT SHAFT SEAL**

# **HAS LOW LEAKAGE AND VERY LOW WEAR**

J. Zuk, L. P. Ludwig, and R. L. Johnson

Aug. 1972 See also B72-10447; NASA-TN-D-5744; NASA-TN-D-6164; NASA-TN-D-7006

**LEWIS-11598**

Design adds gas thrust bearing to face of conventional face seal. Bearing lifts seal's carbon face out of contact after startup and establishes thin gas film between sealing surfaces. Operating pressure and speed capabilities are greater than those of conventional face seals.

**B72-10117**

# **DISPERSION RING REDUCES INJECTOR ORIFICE-TO-ORIFICE FLOW VARIATION**

R. L. Garber (N. Am. Rockwell Corp.) and V. W. Jaqua (N. Am. Rockwell Corp.)  
 1972

**MSC-15953**

Technique substantially reduces machine complexity, improves injector performance and is useful for products mixed or homogenized by injector process. Method is applicable to pharmaceutical, food, dairy and petrochemical industries.

**B72-10118**

# **THREE-POINT COMPOUND SINE PLATE OFFERS COST AND WEIGHT SAVINGS**

A. P. Barras (N. Am. Rockwell Corp.)  
 1972

**MSC-15818**

Work piece adjustment fixture reduces size, weight and set-up complexity of alignment platforms used in metal blank machining. Design benefits designers and manufacturers of machine tools and measuring equipment.

**B72-10120**

# **DYNAMIC VALVE TO SUPPLY CONSTANT TOTAL THRUST TO TWO ORIFICE JETS**

W. H. Egli (Honeywell, Inc.)  
 1972

**ARC-10239**

Valve, maintaining constant total flow, is driven mechanically in periodic alterations to yield correspondingly periodic outputs of constant sum. Design is applicable to development of jet flaps for helicopter use and may be useful in a multinozzle system.

**B72-10122**

# **UNIVERSAL INVERTED FLEXURE**

W. O. Hadland  
 1972

**ARC-10345**

Flexure block fabricated from single piece of material minimizes effect of temperature changes and prevents overstressing of the flexing element.

**B72-10173**

# **VORTEX SERVOVALVE FOR FLUIDIC OR ELECTRICAL INPUT**

T. S. Honda (GE)  
 1972 See also NASA-CR-73304

**ARC-10155**

Proportional pressure control servovalve consisting of fluid amplifier bellows-driven jet-pipe and two vortex valves operating in push-pull, with a pair of bellows for pressure feedback is tolerant to contaminant particles and meets minimum standby flow requirements for applications such as rocket thruster nozzles.

**B72-10174**

# **NEW FULL-COMPLEMENT BALL BEARING LUBRICATION TECHNIQUE**

B. Rockower (MIT)  
 1972

**MSC-13850**

Undersized spacer balls rub against oil impregnated wiper, pick up lubricant, and transmit it to load carrying balls and raceways.

## 07 MACHINERY, EQUIPMENT, AND TOOLS

**B72-10178**

### **AIRFLOW DISTRIBUTION CONTROL FOR IMPROVED TURBINE ENGINE PERFORMANCE**

A. J. Juhasz and J. D. Holdeman

May 1972 See also NASA-TN-D-6435

**LEWIS-11593**

Control allows significant diffuser length and weight reduction, reduces combustor exhaust emissions during engine idle, and improves combustor altitude, relight capability.

**B72-10179**

### **IMPROVED SYSTEM FOR MEASURING SPEED OF ROTATING MACHINERY**

E. G. Smith (GE)

1972

**ARC-10413**

Gear designed with spaces for 61 or 62 teeth but having 1- or 2-tooth gap provides reference point that can be detected electronically and retains convenient count of 60 per revolution obviating need for duplicate electronic equipment.

**B72-10197**

### **BILEAF MECHANICAL STRAIN GAGE**

L. R. Guist

May 1972

**ARC-10303**

Bileaf lever detects small deformations by highly magnifying linear displacements. Device is applicable to force measuring instruments, pressure cells, temperature gages, existing strain gages, dial gages, or extensometers. Additional magnification is obtained by cementing a small mirror to mobile end of bileaf.

**B72-10211**

### **MINIATURE HIGH PRESSURE REGULATOR**

H. W. Wright, Jr. (TRW Systems Group) and W. S.-S. Wang (TRW Systems Group)

May 1972

**ARC-10428**

Metal bellows, capable of supplying required spring rate and operational stability, replaced diaphragms, sliding seals, and springs in design of small gas regulator.

**B72-10216**

### **DETERMINATION OF IMPACT SENSITIVITY OF MATERIALS AT HIGH PRESSURES**

L. Davis, D. Pippen, J. Stradling, and D. Whitaker (Service Technol. Corp.)

Dec. 1972

**MSC-13700**

Compact device is used to determine impact sensitivity of material in static, high pressure, gaseous environment. It can also be instrumented to monitor and record pressure, temperature, and striker impact force. Device is used in conjunction with commercially available liquid oxygen impact tester which provides impact energy.

**B72-10264**

### **TURBOPUMP RADIAL AND AXIAL ROTOR SUPPORT SYSTEM**

P. S. Buckmann (Aerojet Liquid Rocket Co.)

Jun. 1972

**M-FS-21495**

Design of thrust balancer minimizes leakage bypass and obviates need for conventional thrust balancer. System allows operation at low flow rates and high thrust capacity at cryogenic temperatures and high pressures.

**B72-10283**

### **A CABLE STABILIZER FOR OUTDOOR ELEVATORS**

E. J. Davis and B. A. Tolson

Jun. 1972

**KSC-10513**

Stabilizer, developed for outdoor elevators, prevents cables from swaying in the wind.

**B72-10287**

### **COMBINATION THROTTLE AND SHUTOFF VALVE**

J. W. Carriker (Aerojet Liquid Rocket Co.)

Jun. 1972

**M-FS-21513**

Combination of translating sleeve throttle valve and conventional poppet valve provides capability of shutting off flow completely by poppet and sleeve control of the rate of flow. Integration of the two concepts can be accomplished without difficulty and in a manner that requires a minimum of development.

**B72-10292**

### **A METHOD FOR CALCULATING THE EFFECTS OF DESIGN ERRORS AND MEASUREMENT ERRORS ON PUMP PERFORMANCE**

D. A. Anderson

Jun. 1972 See also NASA-TN-D-5919

**LEWIS-11503**

Technique has been developed for calculating effects of design errors and measurement errors on pump performance. Error equations and charts are utilized to relate amount of error in given performance parameter to amount of error in given design or measured variable. Error equations were derived primarily for axial flow pumps, but are not limited to axial flow.

**B72-10319**

### **TOOL CARRIER**

V. A. DesCamp (Martin Marietta Corp.)

Dec. 1972

**M-FS-21469**

Flexible fingers meshed together in hinged container secure working tools and parts around waist or thigh of workman. Hairbrush-like fingers across carrier interior allow tool placement from top or bottom without visual coordination.

**B72-10322**

### **BALL BEARING PROTECTOR**

R. A. Burns

Jul. 1972

**M-FS-21612**

Mechanical device for reducing the stresses imposed on ball bearings when bearings are exposed to forces caused by vibration is described. Bearing protector is press fitted on rotor shaft and slip fitted into bearing housing. Bearing stop which contacts inner race stops shaft and bearing when moving along shaft axis and removes load from ball bearings.

**B72-10325**

### **REMOTE WEIGHING DEVICE**

J. P. Valinsky (McDonnell-Douglas Corp.)

Jul. 1972

**M-FS-21556**

Mechanical device for accurate measurement of weight and changes in weight is presented. Diagram of mechanical equipment is illustrated. Construction of system is described and method of operation is analyzed.

**B72-10326**

### **TURBULENT MIXING FILM COOLING CORRELATION**

A. J. Juhasz and C. J. Marek

Dec. 1972 See also NASA-TN-D-6360

**LEWIS-11417**

Film cooling effectiveness correlation predicts air flow requirement for cooling gas turbine combustors. Turbulent mixing model accounts for mixing rate between cooling film and hot gas stream. Resulting equation correlates data within plus or minus 20 percent.

**B72-10329**

### **PACKAGING CONCEPT FOR LSI BEAM LEAD INTEGRATED CIRCUITS**

B. W. Kennedy

Jul. 1972

**M-FS-21374**

Development of packaging system for mounting beam lead integrated chip circuit on lead frame is discussed. Process for

fabricating large scale integration circuits is described. Diagrams illustrating method of construction are included.

**B72-10332**

**NONCONTACT TORQUE MEASUREMENT USING STROBOSCOPIC TECHNIQUES**

W. H. Leonard (Grumman Aerospace Corp.)

Jul. 1972

**MSC-12282**

Noncontact torquemeter measures torsional deflection of rotating shaft and results are viewed on vernier scale. Magnitude of torque must be calculated from measured deflection. Device has no electric connections with the rotating member and is easy to use.

**B72-10345**

**STEM CLUTCH FOR MOTOR DRIVEN VALVE**

D. E. Blum and J. F. Wiltens

1972

**LRL-10032**

Development of mechanical device to reduce possibility of damage to motor driven needle valve is discussed. Mechanical clutch is employed to allow slippage when needle valve reaches limit of travel. Operation of system for various conditions is described.

**B72-10348**

**AN ECONOMICAL VENT COVER**

A. C. Lee (McDonnell-Douglas Astron. Co.) and M. D. McDonald (McDonnell-Douglas Astron. Co.)

Jul. 1972

**M-FS-20692**

Inexpensive formed-plastic vent cover has been developed that allows controlled purge of vent systems and also provides blowout protection. Cover can also be used in relief mode to allow normal system relief flows without disengaging from vent system. Cover consists of two parts made of plastics with varying densities to fit media used and desired pressures.

**B72-10352**

**REMOTE CONTROL FLARE STACK IGNITER FOR COMBUSTIBLE GASES**

W. L. Ray

Jul. 1972

**M-FS-21675**

Device has been designed and developed for igniting nonrecoverable combustible gases and sustaining combustion of gases evolving from various gas vent stacks. Igniter is superior to existing systems because of simplicity of operation, low cost fabrication, installation, operational and maintainability features, and excellent reliability in all phases of required operations.

**B72-10355**

**PERLOAD INDICATING TURNBUCKLE**

W. T. Appleberry (McDonnell-Douglas Corp.)

Jul. 1972

**M-FS-21488**

Low cost, easily manufactured turnbuckle was developed for applying a predetermined load on strap assemblies. Unit consists of sleeve and nut assembled on turnbuckle that is pulled to predetermined load in tension test machine.

**B72-10377**

**SIMPLE TURBINE BALANCING TEST APPARATUS**

M. H. Vavra (Astro-Aeron. Propulsion Lab.), J. E. Hammer (Astro-Aeron. Propulsion Lab.), and L. E. Bell (Astro-Aeron. Propulsion Lab.)

Jul. 1972 See also NASA-CR-1967

**LEWIS-11658**

Simple, inexpensive apparatus has been devised for testing dynamic balance of turbine rotors. No elaborate instrumentation is required and rotor is spun by directing jet of air against blades. Basic principle involved is that of the vibration of a mass on a spring. Apparatus can be used where conventional, expensive balance facilities are not readily available.

**B72-10384**

**CAVITATION DATA FOR HYDRAULIC EQUIPMENT**

J. Hord (NBS) and R. O. Voth (NBS)

Jul. 1972

**LEWIS-11642**

Development of cavitation B-factors for helium, parahydrogen, nitrogen, fluorine, oxygen, refrigerant 114, and water is discussed. B-factor is defined and numerical relationships are established. Mathematical models are included and alternative methods of determining B-factor are explained.

**B72-10385**

**NONCONTAMINATING TECHNIQUE FOR MAKING HOLES IN EXISTING PROCESS SYSTEMS**

T. P. Hecker, H. P. Czapor, and S. M. Giordano

Jul. 1972 See also NASA-TM-X-2431

**LEWIS-11595**

Technique is developed for making cleanly-contoured holes in assembled process systems without introducing chips or other contaminants into system. Technique uses portable equipment and does not require dismantling of system. Method was tested on Inconel, stainless steel, ASTMA-53, and Hastelloy X in all positions.

**B72-10398**

**PLANETARY ROCK CORER AND DRILL CONCEPTS**

R. E. Imus

Jul. 1972

**NPO-11416**

Several planetary rock corers and drill design concepts have been developed for obtaining subsurface rock samples in future planetary explorations. Tools are designed for unmanned space vehicles. Two devices are rotary impact multiple chisel trepan rock corer and hole drilling tool.

**B72-10400**

**A VALVE CONCEPT FOR REMOTE FLUID FLOW CONTROL**

W. J. Flynn (N. Am. Aviation, Inc.)

Jul. 1972

**M-FS-16097**

Valve concept has been devised which offers lightweight, simplified mechanism capable of automatic control of large number of fluid flow ports. Valve control is achieved with valve stem which is bimetallic device activated by heating coil to open or close selected supply port. Number of controlled ports is limited only by desired physical size of system.

**B72-10404**

**CONTROLLED FLOW ASSEMBLY**

A. E. Cohen (McDonnell-Douglas Corp.)

Jul. 1972

**M-FS-21716**

Incorporation of isolation valves in high pressure oxygen supply system prevents occurrence of shock ignition when valves are opened. Specifications of equipment show flow rates, pressure ratings, and service life. Illustration of equipment is provided.

**B72-10414**

**CHUCK FOR DELICATE DRILLS**

C. S. Copeland

Sep. 1972

**ARC-10660**

Development of oil film technique to couple power between drive spindle and drill chuck for delicate drilling operations is discussed. Oil film permits application of sufficient pressure, but stops rotating when drill jams. Illustration of equipment is provided.

**B72-10426**

**MAGNET-WIRE WRAPPING TOOL FOR INTEGRATED CIRCUITS**

T. H. Takahashi

Aug. 1972

**NPO-11815**

Wire-dispensing tool which resembles mechanical pencil is used to wrap magnet wire around integrated circuit terminals uniformly and securely without damaging insulative coating on

## 07 MACHINERY, EQUIPMENT, AND TOOLS

wire. Tool is hand-held and easily manipulated to execute wire wrapping movements.

**B72-10433**

### **A TOOL FOR CUTTING ULTRA THIN SLITS IN METALS**

W. McMahon (N. Am. Rockwell Corp.)

Jul. 1972

**KSC-10770**

Tool produces slits of 0.0305 mm widths in materials up to RC 50 hardness, minimizes material waste and improves precision. Device may be used for general metal cutting and for producing simulated cracks in metal samples used in fatigue tests.

**B72-10434**

### **AIR ASSIST FUEL NOZZLE REDUCES AIRCRAFT GAS TURBINE ENGINE EMISSIONS AT IDLE OPERATION**

D. Briehl and L. C. Papatrakos

Jul. 1972 See also NASA-TN-D-6404

**LEWIS-11512**

Reduction in unburned hydrocarbons from jet engine by use of air assist fuel nozzle is discussed. Operation of nozzle for improving combustion efficiency by improving fuel atomization is analyzed. Advantages to be achieved by air assist fuel nozzle are analyzed.

**B72-10447**

### **HIGH-SPEED, SELF-ACTING SHAFT SEAL (CIRCUMFERENTIAL TYPE)**

L. P. Ludwig and W. F. Hady

Jul. 1972 See also B72-10114; NASA-TN-D-5744

**LEWIS-11274**

Shaft riding circumferential seal is used with turbine engines under high pressure conditions. Construction of seal is discussed and schematic diagram to show operations is provided.

**B72-10459**

### **ADJUSTABLE LOCKING DEVICE**

O. J. Fincannon (McDonnell-Douglas Corp.)

Aug. 1972

**M-FS-21650**

Adjustable locking device is used for taking up end play of shaft without displacing shaft radially. Coincidentally threaded collars fastened to one or both ends of shaft are threaded in and out of one another for adjustment of end play. Intrinsic feature is its ability to be locked in any translatable position without axial displacement of shaft.

**B72-10470**

### **BALL DETENT MECHANISM**

A. S. Cousin (McDonnell-Douglas Corp.)

Aug. 1972

**M-FS-21735**

Mechanical device for providing redundancy for critical operation is described. Operation of equipment and details of construction are discussed. Two illustrations of equipment to show basic and modified configurations are provided.

**B72-10475**

### **EFFICIENT BAFFLE PREVENTS OIL BACKSTREAMING IN DIFFUSION PUMPS**

J. R. Meneghetti

Aug. 1972

**LRL-10025**

High vacuum diffusion pump baffle, positioned immediately above pump stack, prevents vaporized pumping oil from entering and contaminating test chamber. Pumping vapors are collected and condensed on the baffle and flow back to pump base reservoir.

**B72-10484**

### **SLOT CONFIGURATION FOR AXIAL-FLOW TURBO-MACHINERY BLADES**

W. E. Taylor (United Aircraft Res. Labs.)

Aug. 1972 See also NASA-CR-72870

**LEWIS-11572**

Machining of slot in turbine blades of axial flow turbines to provide flow path between pressure and suction surfaces is

discussed. Slot configuration and improvements in blade performance are described. Diagram of blade slot to show geometry of modification is included.

**B72-10497**

### **A RAPID, PRECISE, RECIPROCATING-MOVEMENT COLOR FILTER SYSTEM**

P. G. Philipps (Electron. Image Systems Corp.), P. Epstein (Electron. Image Systems Corp.), G. Donovan (Electron. Image Systems Corp.), and E. LaWhite (Electron. Image Systems Corp.)

Aug. 1972

**GSFC-11255**

Unit was designed for moving color filters in and out of position in less than 46 ms. System may be used to record previously derived colors on photorecorder or to scan different color or wavelength components of rapidly passing scene, as in aerial reconnaissance. Rapid, precise reciprocating movement may be useful in purely mechanical and chemical applications.

**B72-10498**

### **NO-ERR TYPING AIDS**

R. D. Dubois (Boeing Co.) and G. T. Pinson (Boeing Co.)

Aug. 1972

**M-FS-15218**

Device for aligning paper in typewriter to correct one letter or line of type is discussed. Two types of correcting devices are described and illustrations of the devices are provided.

**B72-10499**

### **TANDEM STEERABLE RUNNING GEAR**

O. J. Fincannon (McDonnell-Douglas Corp.) and D. L. Glenn (McDonnell-Douglas Corp.)

Aug. 1972

**M-FS-22012**

Characteristics of steering assembly for vehicle designed to move large components of space flight vehicles are presented. Design makes it possible to move heavy and bulky items through narrow passageways with tight turns. Typical configuration is illustrated to show dimensions of turning radius and minimum distances involved.

**B72-10509**

### **A TOOL FOR MEASURING ELEVATOR CABLE TENSION**

E. L. Weaver (Bendix Corp.)

Dec. 1972

**KSC-10708**

Simple tool for measuring relative cable tension is described, which weighs approximately two pounds and can be produced at one-tenth cost of present tools.

**B72-10536**

### **HIGH-VOLUME PRESSURE RELIEF VALVE**

W. H. Dillard (Bendix Corp.)

Dec. 1972

**KSC-10707**

Valves with counterweights to assist in opening and closing are described, which can release large volumes of gas almost instantaneously, and provide airtight seals.

**B72-10537**

### **ADVANCED HIGH-TEMPERATURE ELECTROMAGNETIC PUMP**

J. W. Gahan (GE) and A. H. Powell (GE)

Sep. 1972 See also NASA-CR-1949; NASA-CR-1950; NASA-CR-1951

**LEWIS-11283**

Three phase helical, electromagnetic induction pump for use as boiler feed pump in potassium Rankine-cycle power system is described. Techniques for fabricating components of pump are discussed. Specifications of pump are analyzed.

**B72-10538**

### **SELF-ALIGNING, LOW-PRESSURE SEALING POPPET VALVE**

R. Gonzalez (N. Am. Rockwell Corp.) and W. A. Bratfisch (N. Am. Rockwell Corp.)

Sep. 1972  
**MSC-17745**

Design and characteristics of poppet valve operated by very low differential pressures to control fluid flow are described. Valve is used to control flow of petroleum, chemical, and aircraft hydraulics where low leakage rates and activation at low pressures are required.

**B72-10539**  
**FILM HANDLING SYSTEM FOR LASER SCANNER/RECORDER**  
 A. Maciel, Jr. (Singer-Gen. Precision, Inc.)  
 Dec. 1972

**MSC-14121**  
 System is described for transporting and holding cut or roll 35-mm, 70-mm, 12.50-cm, and 24.13-cm films without replacement of platens or use of tools of any kind.

**B72-10542**  
**FILM HOLDER FOR CURVED VACUUM PLATEN**  
 A. Maciel, Jr. (Singer Corp.) and C. E. Hauber (Singer Corp.)  
 Sep. 1972

**MSC-14120**  
 Vacuum apparatus for holding photographic film of various widths against cylindrically curved platens is discussed. Construction details and method of operation are explained. Illustration of equipment is provided.

**B72-10569**  
**VISE TO HOLD BONES OR OTHER IRREGULAR OBJECTS**  
 R. H. Dowell  
 Sep. 1972

**ARC-10679**  
 Vise with stationary vee-shaped jaw and segmented notched jaw for holding irregular shaped objects is described. Operation of the device and specific application to holding bones are explained. Diagram of equipment is provided.

**B72-10574**  
**SELF-DEPLOYING BOOM**  
 W. T. Tumulty and W. P. Sours  
 Sep. 1972

**GSFC-10566**  
 Development and operation of metal ribbon which acts like self deploying boom are described. Metal ribbon is retained on two rollers for storage and extends into nonretractable tubular structure upon release. Illustration of equipment is provided.

**B72-10575**  
**SLITTING FLAT CONDUCTOR CABLES WITH THE SINGLE CUTTING EDGE SLITTER**  
 W. Angele and C. M. Chambers  
 Sep. 1972

**M-FS-20111**  
 Manually operated slitter can cut single slit in flat conductor cable to any desired length. Lateral position of flat conductor cable is adjusted with aid of optical magnifier and cursor glass to ensure that slit is accurately placed between conductors. Multiple slits may be made by repeating procedure for single slit.

**B72-10597**  
**PRECISION MACHINING OF STEEL DECAHEDRONS**  
 W. J. Abernathy and J. R. Sealy  
 Sep. 1972

**M-FS-21361**  
 Production of highly accurate decahedron prisms from hardened stainless steel is discussed. Prism is used to check angular alignment of mounting pads of strapdown inertial guidance system. Accuracies obtainable using recommended process and details of operation are described. Photographic illustration of production device is included.

**B72-10640**  
**FLUID OPERATED QUICK RELEASE MECHANISM**  
 R. A. Brown (Sperry Rand Corp.)

Oct. 1972  
**M-FS-20205**

Gas operated release mechanism releases load by fluid pressure to provide positive action quick release. Method can be used with large loads and is useful in repetitive cycling functions where shear pins and similar devices would be cumbersome.

**B72-10645**  
**FILL AND VENT QUICK DISCONNECT**  
 R. Y. Boerner (McDonnell-Douglas Corp.) and R. W. Hedrick (McDonnell-Douglas Corp.)  
 Dec. 1972

**M-FS-21822**  
 Hydraulic disconnect coupling on ground serving half of spacecraft refrigeration cooling system employs movable center stem for venting and closing nipple poppet. Self sealing poppet quickly connects cooling system to spacecraft without manual work. Recessed sealing surface insures open poppet when stem retracts.

**B72-10672**  
**IMPROVED LIP SEAL FOR ROTATING SHAFTS**  
 D. L. Endicott (McDonnell-Douglas Corp.)  
 Oct. 1972

**LEWIS-11602**  
 Sealing efficiency, service life, and seal loading limits of lip seal for rotating shafts are analyzed. Construction of seal and areas of application are described. Specific advantages of improved lip seal over conventional seals are listed.

**B72-10678**  
**PORTABLE BEVELING TOOL**  
 R. H. Snowden (N. Am. Rockwell Corp.)  
 Oct. 1972

**M-FS-16863**  
 Portable tool was designed to semiautomatically bevel end surfaces of tubular or cylindrical components. Tool may be used for fabrication of elbow assembly which requires mating flange and elbow by fusion butt welding.

**B72-10681**  
**HIGH TORQUE BELLOWS SEAL ROTARY DRIVE**  
 A. J. Diaguila, J. W. Macomber, and D. W. Adams  
 Oct. 1972

**LEWIS-11813**  
 Bellows seal rotary drive device was developed which allows high torque transmission through sealed compartments. Bearing friction which would normally be carried by sealing bellows in comparable devices is absorbed by universal-gimbal joint. It can be used to transmit high torque, low speed, rotary motion through sealed barriers to prevent contamination or escape of fluids.

**B72-10685**  
**A CONCEPT FOR UNIVERSAL PLIERS**  
 E. T. Neal (Boeing Co.)  
 Oct. 1972

**KSC-10768**  
 By modification in existing design, pliers can be made to have one pair of handles that will accept number of different jaws. Concept is useful for light to medium duty service. Complete set of jaws may be made to suit specific hobbies or applications.

**B72-10687**  
**A SHUT-OFF VALVE FOR FLEXIBLE TUBING**  
 W. W. Reyburn (McDonnell-Douglas Corp.)  
 Dec. 1972

**M-FS-21731**  
 Design of light weight valve for flexible tubing is described. Valve is hand operated and provides positive sealing in normally closed position. Diagram is provided to show construction of valve. Principles of operation are explained.

**B72-10688**  
**CYLINDRICALLY SHAPED ROPE LADDER**  
 C. S. Range (N. Am. Aviation, Inc.)  
 Oct. 1972



## 08 FABRICATION TECHNOLOGY

M-FS-16319

Cylindrical shaped ladder is rope net held in cylindrical configuration by supporting metal hoops which are spaced at vertical intervals along ladder. Rope ladder is easily handled and transported.

## 08 FABRICATION TECHNOLOGY

B72-10025

### SIMPLE METHOD FOR FORMING THIN-WALL PRESSURE VESSELS

A. L. Erickson and L. R. Guist  
1972 See also NASA-TM-X-62043

ARC-10511

Application of internal hydrostatic pressure to seam-welded circular cylindrical tanks having corner-welded, flat, circular ends forms large thin-walled high quality tanks. Form limits expansion of cylindrical portion of final tank while hemispherical ends develop freely; no external form or restraint is required to fabricate spherical tanks.

B72-10041

### BONDING TITANIUM TO RENE 41 ALLOY

R. W. Scott (GE)  
1972

ARC-10311

Pair of intermediate materials joined by electron beam welding method welds titanium to Rene 41 alloy. Bond is necessary for combining into one structure high-strength-to-density-ratio titanium fan blades and temperature-resistant nickel-base alloy turbine buckets in VTOL aircraft lift-fan rotor.

B72-10058

### ALUMINUM FOIL INTERCONNECTS FOR SOLAR CELL PANELS

S. Schwartz (Hughes Aircraft Co.) and L. B. Keller (Hughes Aircraft Co.)  
1972

ARC-10374

Commercially available sonic welding system and a specially-designed tip bonds aluminum foil interconnects to titanium-silver solar cell contacts.

B72-10081

### LOW-FRICTION BALL-AND-SOCKET

R. E. Imus  
1972

NPO-11348

Ball-bearing retainer assembly reduces friction in ball-and-socket mount which replaces gimbals mounting used with spacecraft antennas.

B72-10237

### THERMAL ANALOG DEVICE REDUCES MACHINING ERRORS

E. R. McClure  
Dec. 1972

AEC-10080

Thermal analog devices predict thermal expansion and contraction of machine structures subjected to various heat inputs. Analog devices correct positioning of machine tools to compensate for distortion of machine frame.

B72-10238

### SURVEY OF INFORMATION CONCERNING LARGE DIAMETER DEEP HOLE DRILLING

Innovator not given (Nucl. Defense Res. Corp.) Dec. 1972 See also NVO-423-1

AEC-10051

Data are presented, covering drilling techniques, factors

affecting penetration rates, cost estimation, and system improvement. Various drill bits are also discussed.

B72-10252

### THERMALLY STABLE STRUCTURAL FRAMEWORK

H. U. Schuerch (Astro Res. Corp.)  
Sep. 1972 See also NASA-CR-1973

ARC-10612

Development of structural framework with zero or negligible thermal expansion is discussed. Combination of two types of metallic materials in binary trellis to compensate for thermal expansion is explained. Construction details are presented and illustration is included.

B72-10288

### JOINING PRECIPITATION-HARDENED NICKEL-BASE ALLOYS BY FRICTION WELDING

T. J. Moore  
Jun. 1972 See also NASA-TM-X-2411

LEWIS-11514

Solid state deformation welding process, friction welding has been developed for joining precipitation hardened nickel-base alloys and other gamma-prime-strengthened materials which heretofore have been virtually unweldable. Method requires rotation of one of the parts to be welded, but where applicable, it is an ideal process for high volume production jobs.

B72-10293

### EXPLOSIVE CORD

Innovator not given (Explosive Technol. Co.) Jun. 1972

M-FS-21928

Device, jetcord, is metal-clad linear explosive of sufficient flexibility to allow forming into intricate shapes. Total effect is termed "cutting" with jetcord consistently "cutting" a target of greater thickness than can be penetrated. Applications include sheet metal working, pipe cutting and fire-fighting.

B72-10349

### TECHNIQUE FOR PRODUCING WIND-TUNNEL HEAT-TRANSFER MODELS

C. E. DeRose, W. C. Norman, L. Yee, and D. M. Oishi  
Dec. 1972

ARC-10658

Inexpensive thin skinned wind tunnel models with thermocouples on certain surface areas were fabricated. Thermocouples were designed for measuring aerodynamic heat transfer in wind tunnels.

B72-10356

### NEW COMPRESSION MOLDING PROCESS OF THERMO-SETTING PLASTIC COMPOUNDS

W. C. Heier  
Jul. 1972

LANGLEY-10782

Process permits molding of longer, thinner bodies, such as cylindrical rocket motors, while maintaining equal or superior physical properties. Major advantages of process are presented.

B72-10359

### LOW COST ANTI-GALLING BUSHINGS

E. O. Spencer (N. Am. Rockwell Corp.)  
Dec. 1972

LEWIS-11724

Heat shrinkable Teflon tubing is cut to size, slipped onto shaft, heated to shrink tightly to shaft, or machined to final outside diameter size. Shaft bushings fabricated from shrinkable Teflon tubing provide economical close fitting sleeves that prevent galling and contamination in valves.

B72-10374

### NONDESTRUCTIVE TESTING FOR BRAZE VOIDS IN THIN PANELS BY USE OF SPECIAL COATINGS

J. C. Gibson (AiRes. Mfg. Co.)  
Jul. 1972

LANGLEY-10486

Application of commercial coating to exterior of sandwich

panel structures for determining presence of voids in brazed plates is discussed. Procedure for applying coating material and method of conducting nondestructive tests are explained. Illustrations are included to show appearance of voids.

**B72-10394**  
**MANUFACTURING CONTAMINATION PREVENTION HANDBOOK**

R. T. Mackey, Sr. (N. Am. Rockwell Corp.)

Jul. 1972

**M-FS-19113**

Manufacturing management discipline handbook concerning contamination prevention may present principles and guidelines which can be adopted for industrial and commercial manufacturer usage. Contamination prevention program is categorized into three basic aspects: initial prevention; control of amount of unpreventable contamination; and detection and elimination of remaining contamination.

**B72-10427**  
**ACOUSTIC EMISSION USED AS WELD QUALITY MONITOR**

W. O. Jolly

Dec. 1972

**AEC-10018**

Acoustic emission technique is described for use as quality control tool in nondestructive inspection of welds. Stress mounts around weld defect until it exceeds yield strength of material. Pressure wave relieving the stress is emitted and followed by oscillations caused by multiple reflections. Acoustic emissions are then detected by sensor similar to ultrasonic sensor.

**B72-10428**  
**FABRICATION TECHNIQUES FOR ORGANIC ELECTROLYTE BATTERY**

G. D. McDonald

Dec. 1972 See also SC-CR-69-3290

**AEC-10019**

Experiments in fabrication and testing of silver chloride electrodes for use in organic electrolyte batteries are discussed. Electrodes were fabricated by pelletizing, sintering, hot press binding, and paste binding silver chloride on expanded metal grids of nickel or silver. Each technique was investigated by statistically designed factorial experiment.

**B72-10432**  
**TWISTABLE MOLD FOR HELICOPTER BLADES**

E. S. Carter (United Aircraft Corp.) and E. F. Kiely (United Aircraft Corp.)

Dec. 1972

**ARC-10682**

Design is described of mold for fabrication of blades composed of sets of aerodynamic shells having same airfoil section characteristics but different distributions. Mold consists of opposing stacks of thin templates held together by long bolts. When bolts are loosened, templates can be set at different positions with respect to each other and then locked in place.

**B72-10445**  
**NONFLAMMABLE AND ABRASION RESISTANT COATING PROCESS FOR GLASS FIBERS**

J. J. Dillon

Jul. 1972

**MSC-14024**

Surface treating glass fibers with polytetrafluoroethylene improves their resistance to heat and flammability. Organosilicon lubricant padding improves fabric flexibility.

**B72-10457**  
**LATCH MECHANISM**

G. W. Ulrich (McDonnell-Douglas Corp.)

Aug. 1972

**M-FS-21606**

Ratchet device transfers loads imposed on latch to support structure before latch springs resist loads, positively locks two pivoted structures on contact, and carries loads in all directions.

**B72-10513**

**A NEW LOW-COST METHOD FOR PRODUCING COLLIMATING MIRRORS**

Innovator not given (Lewis Res. Center) Aug. 1972

**LEWIS-11553**

New method for finishing and plating machined surfaces for collimating mirrors holds surface tolerances within accepted limits. Technique reduces cost to less than one-tenth that of conventional methods.

**B72-10534**

**SPUTTER ETCHING OF HEMISPHERICAL BEARINGS**

R. J. Schiesser (MIT)

Sep. 1972

**HQ-10712**

Technique was developed for fabricating three dimensional pumping grooves on gas bearings by sputter etching. Method eliminates problems such as groove nonuniformity, profile, and finish, which are associated with normal grooving methods.

**B72-10562**

**BUILT-IN BLEEDER SYSTEM IN LAMINATED PLASTIC STRUCTURES**

A. G. Aguilar (N. Am. Rockwell Corp.) and G. J. Cizek (N. Am. Rockwell Corp.)

Dec. 1972

**MSC-17713**

Method is described for interplying resin-absorbing, glass bleeder cloth with the layout for fabricating laminated nonflammable plastic structures with wrinkle-free surfaces.

**B72-10593**

**FABRICATION OF COOLED, GRAPHITE-LINED STRUCTURES**

R. A. Duscha and V. R. Stubbs (Aerojet Liquid Rocket Co.)

Sep. 1972 See also NASA-CR-120853

**LEWIS-11741**

Improved method of fabricating cooled graphite-lined thrust chamber has been developed. Layer of nickel is electrodeposited onto outer surface of machined and contoured graphite liner. Coolant passages are machined into nickel layer, filled with wax, outer shell electroformed over this, and wax removed. Tests in flox/methane rocket engine were completely successful.

**B72-10595**

**MACHINE FINISHES BALLS TO HIGH DEGREE OF ROUNDNESS**

W. Angele and J. P. Hill, Jr.

Sep. 1972

**M-FS-21448**

Machine was developed to finish ball to roundness within 12.5 nm (half a microinch) from any types of hard material. Grinding and polishing to this tolerance is accomplished by lapping elements on four to six motor-driven spindles. Spindles are adjustably spring-loaded to ensure constant contact pressure on ball and are driven by variable speed electric motors.

**B72-10616**

**POLISHING IS MADE CHEAPER BY DISPOSABLE DIAMOND-IMPREGNATED ABRASIVE CLOTH**

F. J. Harper (Brown and Root/Northrop)

Dec. 1972

**MSC-14247**

Diamond impregnated abrasive cloth eliminated expensive diamond pastes and was economically disposed of to avoid contamination. Cloth was spunbonded nylon, but any napless fabric could be used. Cloth was sprayed with diamond abrasive gel.

**B72-10635**

**DESIGN CRITERIA MONOGRAPH ON TURBOPUMP INDUCERS**

Innovator not given (Lewis Res. Center) Dec. 1972 See also

**NASA-SP-8052**

**LEWIS-11824**

State of the art and design criteria for liquid rocket engine

## 08 FABRICATION TECHNOLOGY

turbopump inducers are summarized for optimal fabrication. Design criteria optimize hydrodynamic parameters to obtain highest suction specific speed without violating structural and mechanical constraints.

### B72-10638 PHOTOEMISSIVE COATING

R. A. Gange (RCA)

Dec. 1972

M-FS-22003

Polystyrene coating is applied to holographic storage tube substrate via glow discharge polymerization in an inert environment. After deposition of styrene coating, antimony and then cesium are added to produce photoemissive layer. Technique is utilized in preparing perfectly organized polymeric films useful as single-crystal membranes.

### B72-10644 AN APPROACH TO REAL-TIME PROCESS CONTROL OF SEMICONDUCTOR WIRE-BONDING

Innovator not given (Vanzetti Infrared and Computer Systems) Oct. 1972

M-FS-21558

Thermal probe using infrared-transparent optical fiber attached to tip of collet with resin to prevent movement during bonding is used to accurately measure temperature during wire bonding on semiconductors for use in large scale integrated circuits.

### B72-10649 A SIMPLE, EFFICIENT RESISTANCE SOLDERING APPARATUS

C. M. Vermillion

Dec. 1972

GSFC-10913

Multiple resistance soldering device for attaching electric leads to multiple terminal block connectors uses power source with one terminal connected to working probe, and other terminal attached to connector carrying common pins for lead insertion. Mating of male and female connectors solders each lead to individual cup pin.

### B72-10683 THE WELD-BRAZING METAL JOINING PROCESS

T. T. Bales, W. E. Arnold, Jr., and A. B. Lawson

Dec. 1972

LANGLEY-11072

Superior mechanical properties were obtained in metal joints weld-brazed between faying surfaces. Weld-braze applications and advantages are listed.

### B72-10734 REDUCTION OF POROSITY IN ALUMINUM WELDMENTS

W. S. Lee

Dec. 1972

MSC-14198

Method is described for elimination of porosity of aluminum weldments by replacing polyvinyl chloride tubing (used to connect welder to gas source, and permeable to moisture at high humidity) with copper tubing. In addition liquid argon gas is used at weld stations.

### B72-10744 ELECTRO-CHEMICAL GRINDING

P. L. Feagans (AiRes. Manuf. Co.)

Dec. 1972

LANGLEY-10801

Electro-chemical grinding technique has rotation speed control, constant feed rates, and contour control. Hypersonic engine parts of nickel alloys can be almost 100% machined, keeping tool pressure at virtual zero. Technique eliminates galling and permits constant surface finish and burr-free interrupted cutting.

### B72-10745 IMPROVED PHOTOETCHING FABRICATION METHOD

C. L. Kistler (Pratt and Whitney Aircraft)

Dec. 1972

LEWIS-11268

Photoetching method producing well-defined lines with minimum undercutting was developed for etching coolant passages in nickel sheet. Phosphate coating is applied over conventional silver plate maskant and phosphoric acid solution is used to remove silver maskant. Phosphoric acid prevents etching of silver edges and mask has sharply-defined lines.

B72-10754

### JOINING POROUS COMPONENTS TO SOLID METAL STRUCTURES

A. Fortini and G. Tulisiak

Dec. 1972 See also B68-10331; NASA-CR-72994

LEWIS-11259

Process for joining porous metal material to solid metal structure without cracking or blockage of porous component is described. Procedures of electron beam welding and electroforming are discussed. Illustration of microstructure resulting from process is included.

## 09 COMPUTER PROGRAMS

B72-10015

### SOFTWARE CONTROL FOR LARGE SCALE ON-BOARD CHECKOUT: A CONCEPT

H. K. Grounds (IBM) and D. H. Norton, Jr. (IBM)

1972

MSC-13977

Two level system checkout in which first level satisfies continuous monitoring requirements and second level provides fault isolation to satisfy maintenance requirements, provides self-checking capability for monitoring system and enables recovery from unexpected error or failure interruptions. System must perform operational duties of navigation, control, and experimentation.

B72-10023

### ALGORITHM FOR LIAPUNOV STABILITY ANALYSIS

G. R. Geiss (Grumman Aerospace Corp.), V. D. Cohen (Grumman Aerospace Corp.), and D. S. Rothschild (Grumman Aerospace Corp.)

1972 See also NASA-CR-1729; NASA-CR-73383

ARC-10498

Development of algorithm provides automatic computation of quadratic estimate of domain of stability for stable equilibrium states of nonlinear systems of ordinary differential equations.

B72-10064

### PREDICTION OF DUCTED FAN PERFORMANCE

M. R. Mendenhall (Nielsen Eng. and Res., Inc.) and S. B. Spangler (Nielsen Eng. and Res., Inc.)

Aug. 1972

ARC-10615

Computer program to predict performance of ducted fan combination at specified advance ratio and angle of attack is described. Parameters affecting performance of ducted fan are presented. Information obtained from computer program is explained for various conditions considered.

B72-10065

### VARIABLE DIMENSION AUTOMATIC SYNTHESIS PROGRAMS (VASP)

J. S. White and H. Q. Lee

1972

ARC-10616

Variable dimension FORTRAN 4 version of the Automatic Synthesis Program (ASP) compensates for limitations within the program itself. Improvements are versatile programming language, convenient input/output format, new subprograms, variable dimensioning, and efficient storage.

**B72-10067****PROGRAM TO DETERMINE RADIATING, NONADIABATIC, INVISCID FLOW OVER A BLUNT BODY BY THE METHOD OF INTEGRAL RELATIONS**F. W. Taylor  
1972**LANGLEY-11048**

Computer program performs the many calculations necessary for solving radiating, nonadiabatic flow of air in chemical equilibrium. Solution method provides accurate description of blunt body flow field in subsonic region.

**B72-10068****PROGRAM FOR THE TRANSIENT RESPONSE OF ABLATING AXISYMMETRIC BODIES INCLUDING THE EFFECTS OF SHAPE CHANGE**L. M. Howser and S. S. Tompkins  
1972**LANGLEY-11049**

Governing differential equation, boundary conditions for the analysis on which computer program is based, and method of solution of resulting finite difference equations are discussed in the documentation.

**B72-10069****MAIN TANK INJECTION PRESSURIZATION PROGRAM**E. C. Cady (McDonnell-Douglas Corp.) and D. W. Kendle (McDonnell-Douglas Corp.)  
Dec. 1972**LEWIS-11368**

Computer program predicts performance of fluorine-hydrogen main tank injection pressurization system for full range of liquid-hydrogen-fueled space vehicles. Analytical model includes provisions for heat transfer, injectant jet penetration, and ullage gas mixing. Analysis predicts GF2 usage, ullage gas and tank wall temperatures, and LH2 evaporation.

**B72-10070****DESIGN OF TWO-DIMENSIONAL SHARP-EDGED-THROAT SUPERSONIC NOZZLE WITH BOUNDARY-LAYER CORRECTION**L. J. Goldman and M. R. Vanco  
1972**LEWIS-11636**

Computer program accounts for effective nozzle geometry changes due to boundary layer displacement thickness. Program input and output are discussed.

**B72-10071****PROGRAM FOR DETERMINATION OF RADIATION INTERCHANGE FACTORS**L. W. Fesler (N. Am. Rockwell Corp.) and T. S. McClintic (N. Am. Rockwell Corp.)  
Dec. 1972**MSC-17563**

Digital computer model was devised for determining thermal and solar radiation interchange factors. Program computes interchange factors among surfaces having any combination of following properties: diffuse emittance and reflectance, diffuse emittance and specular reflectance, diffuse emittance and components of diffuse and specular reflectance, and directional emittance and bidirectional reflectances.

**B72-10072****WIND TRAJECTORY TRACING FOR AIR POLLUTION STUDIES (AIRPOL)**A. B. Street and J. N. Strand  
1972**NPO-11892**

Wind trajectory computer program, consisting of data handling program and analysis program, traces Los Angeles Basin wind patterns either backward or forward in time. Program may be applicable to other areas.

**B72-10073****STRUCTURAL DESIGN AND STRESS ANALYSIS PROGRAM****FOR ADVANCED COMPOSITE FILAMENT-WOUND AXISYMMETRIC PRESSURE VESSELS (COMTANK)**A. C. Knoell  
1972**NPO-11943**

Computer program has been specifically developed to handle, in an efficient and cost effective manner, planar wound pressure vessels fabricated of either boron-epoxy or graphite-epoxy advanced composite materials.

**B72-10111****PROGRAM FOR CALCULATING LAMINAR AND TURBULENT BOUNDARY LAYERS IN ARBITRARY PRESSURE GRADIENTS**W. D. McNally  
1972**LEWIS-11097**

Computer program predicts growth of boundary layers along any surface where air is flowing. Two integral methods, Cohen-Reshotko and Sasman-Cresci, calculate laminar boundary layers and turbulent boundary layers, respectively; Schlichting-Granville method predicts transition from laminar to turbulent flow.

**B72-10142****STANDARDIZATION AND QUALIFICATION OF COMPUTER PROGRAMS FOR CIRCUIT DESIGN**

D. F. Martin (Calif. Univ.), L. P. McNamee (Calif. Univ.), D. E. Meyerhoff (Calif. Univ.), and T. S. Chow (Calif. Univ.)

1972

**M-FS-21537**

Study presents methods and initial procedures which may be obtained for development of more efficient uniform network analysis input language and theoretical tools to prove equivalence of data representations.

**B72-10153****MISLIFT AND MISS-DRAW PROGRAMS**C. M. Jackson, Jr. and W. C. Sawyer  
May 1972**LANGLEY-10932; LANGLEY-10935**

Method, developed and coded for digital computation, predicts aerodynamic loading on configurations for which linear theory assumptions are violated. Program is written in FORTRAN 4 for use on CDC-6000 series computers.

**B72-10182****PROLATE SPHEROIDAL SLOSH MODEL FOR FLUID MOTION**H. A. Flanders (TRW Systems Group)  
May 1972**MSC-13864**

Mathematical model, designed for zero gravity conditions, analyzes dynamic effects of large amplitude fluid motion interior to a rigid body. It has two advantages over other mathematical models: (1) constrains slosh motion to given region in natural manner, and (2) allows equilibrium position of slosh mass to be anywhere on slosh surface.

**B72-10214****RELIABILITY ANALYSIS BASED ON OPERATIONAL SUCCESS CRITERIA**

F. G. Esmond (Santa Barbara Res. Center) and M. D. Johnson (Santa Barbara Res. Center)

May 1972

**ARC-10490**

Failure Modes, Effects, and Criticality Analysis Model disregards failures of insignificant components. Assumptions used to establish baselines for reliability prediction and analytical method are listed. Techniques are applicable to any commercial design and can be extended into software or management systems.

**B72-10222****OPTIMIZATION TECHNIQUE FOR PROBLEMS WITH AN INEQUALITY CONSTRAINT**

K. J. Russell (Hughes Aircraft Co.)

## 09 COMPUTER PROGRAMS

1972

### ARC-10522

General technique uses a modified version of an existing technique termed the pattern search technique. New procedure called the parallel move strategy permits pattern search technique to be used with problems involving a constraint.

### B72-10225

#### INDEFINITE INTEGRALS OF PRODUCTS OF SOME EXPONENTIAL AND TRIGONOMETRIC FUNCTIONS

W. Rostafinski

May 1972

### LEWIS-11493

Two integrals have been developed which are needed to solve certain problems of mathematical physics related to the Bessel and Euler equations. Integrals of this type have known application in problems using cylindrical coordinates.

### B72-10253

#### COMPUTER PROGRAM DRAWS THREE-DIMENSIONAL SURFACES

R. B. Canright, Jr. and P. Swigert

May 1972 See also NASA-TM-X-1589

### LEWIS-10482

Computer plotting program PLOT 3D draws views of surface forms  $z = f(x,y)$ . Surface thus defined by program may be drawn after arbitrary rotations. Program portrays behavior of various functions involving two variables in many engineering, physics, and mathematical relationships.

### B72-10261

#### DUAL REDUNDANT CORE MEMORY SYSTEMS

F. E. Hull (Martin Marietta Corp.)

Jun. 1972

### MSC-13993

Electronic memory system consisting of series redundant drive switch circuits, triple redundant majority voted memory timing functions, and two data registers to provide functional dual redundancy is described. Signal flow through the circuits is illustrated and sequence of events which occur within the memory system is explained.

### B72-10265

#### SNAP DYNAMICS

L. Kiefling, W. D. Whetstone, and C. E. Jones

Jun. 1972

### M-FS-21531

Computer program calculates normal vibration modes of complex structures eliminating excessively large amounts of input data, run time, and core storage. Provision for accuracy improvement is also included.

### B72-10267

#### VIDEO INFORMATION SYSTEM

E. R. Ritch (Ampex Corp.)

Jun. 1972

### M-FS-21711

Computerized information storage and display system directs storage of documents, drawings, photographs, fingerprints, etc., and permits rapid retrieval for real-time viewing on remote consoles.

### B72-10299

#### RAPID ANALYSIS OF ELECTRIC PROPULSION MISSIONS

A. C. Masey

Sep. 1972

### ARC-10430

Computer program has been designed to handle computations for low thrust missions rapidly and with acceptable accuracy. Program defines performance and system requirements of electrically-propelled unmanned planet-orbiter and flyby missions. The program is written in FORTRAN 4 for use on an IBM 360 or CDC 6600 computer.

### B72-10311

#### CUBIC SPLINE FUNCTIONS FOR CURVE FITTING

J. D. Young

Dec. 1972 See also UCRL-17659; UCRL-17742; UCRL-18253; UCRL-18346; UCRL-18364

### LRL-10034

FORTRAN cubic spline routine mathematically fits curve through given ordered set of points so that fitted curve nearly approximates curve generated by passing infinite thin spline through set of points. Generalized formulation includes trigonometric, hyperbolic, and damped cubic spline fits of third order.

### B72-10335

#### MATHEMATICAL TECHNIQUES FOR ESTIMATING OPERATIONAL READINESS OF COMPLEX SYSTEMS

I. D. Jacquier (N. Am. Rockwell Corp.) and P. A. Miltz (N. Am. Rockwell Corp.)

Jul. 1972

### MSC-17694

Development of methods for predicting operational readiness of complex systems based on probability theory is discussed. Operational readiness of systems is defined and mathematical relationships involved in determining readiness are presented. Example of reliability engineering and quality control is included.

### B72-10350

#### MEMORY REDUCTION THROUGH HIGHER LEVEL LANGUAGE HARDWARE

H. Kerner and L. Gellman

Jul. 1972

### M-FS-21128

Application of large scale integration in computers to reduce size and manufacturing costs and to produce improvements in logic function is discussed. Use of FORTRAN 4 as computer language for this purpose is described. Effectiveness of method in storing information is illustrated.

### B72-10362

#### COMPUTER PROGRAM FOR NATURAL GAS FLOW THROUGH NOZZLES

R. C. Johnson

Dec. 1972

### LEWIS-11534

Subroutines, FORTRAN 4 type, were developed for calculating isentropic natural gas mass flow rate through nozzle. Thermodynamic functions covering compressibility, entropy, enthalpy, and specific heat are included.

### B72-10405

#### FORTRAN PROGRAM FOR COMPUTING COORDINATES OF CIRCULAR-ARC, SINGLE AND TANDEM, TURBINE AND COMPRESSOR, BLADE SECTIONS ON A PLANE

W. D. McNally and J. E. Crouse

Dec. 1972

### LEWIS-11237

Coordinates for circular arc blade section of aircraft high speed compressor gas turbines were computed using FORTRAN 4 program. Aerodynamic configurations studied include single segment airfoils, airfoils with slots, and multiple segment tandem arranged airfoil.

### B72-10410

#### PROGRAM TO DETERMINE SPACE VEHICLE RESPONSE TO WIND TURBULENCE

H. D. Wilkening (Martin Marietta Corp.)

Dec. 1972

### M-FS-21614

Computer program was developed as prelaunch wind monitoring tool for Saturn 5 vehicle. Program accounts for characteristic wind changes including turbulence power spectral density, wind shear, peak wind velocity, altitude, and wind direction using stored variational statistics.

### B72-10444

#### VARIABLE BOUNDARY II HEAT CONDUCTION

J. Gramer (Gen. Dyn./Convair) and R. F. O'Neill (Gen. Dyn./Convair)

Jul. 1972

**LEWIS-10679**

Computer program for solving both transient and steady-state heat transfer problems is presented. Specific applications of computer program are described. Formulation for individual nodes of solid medium for heat balance is presented. Diffusion equation is solved for all nodes simultaneously at finite increments of time.

**B72-10458****SYSTEMS EFFECTIVENESS EVALUATION PROGRAM**

H. P. Nicely, Jr. (GE) and W. D. Givens (GE)

Aug. 1972

**HQ-10306**

Eight integrated computer programs provide needed capability to reduce man-hours needed to perform routine monitoring and assessment of effectiveness, reliability, and maintainability of large electronic equipment systems.

**B72-10483****COMPUTER PROGRAM FOR CALCULATING THE TEMPERATURE FIELD OF FACE SEALS**

T. E. Russell, G. P. Allen, L. P. Ludwig, and R. L. Johnson

Aug. 1972

**LEWIS-11110**

FORTAN 4 program for use on IBM 7094 computer for calculating temperature field of shaft seals is described. Shaft seals are composed of basically axisymmetric bodies. Cylindrical coordinate system is used as basis for analysis. Program is quite general and can be applied to variety of axisymmetric body problems.

**B72-10486****COMPENSATOR DESIGN FOR LOW-SENSITIVITY LINEAR TIME-INVARIANT SYSTEMS (COMPDES)**

L. Willner (Rensselaer Polytech. Inst.)

Aug. 1972

**M-FS-21652**

Digital computer program written in FORTAN 4 has capability of synthesizing low order compensators to stabilize dynamical system in presence of parameter variations. Design scheme is accomplished by means of sensitivity function which is minimized with respect to eigenvalues.

**B72-10504****GEOMETRICALLY NONLINEAR STATIC AND DYNAMIC ANALYSIS OF ARBITRARILY LOADED SHELLS OF REVOLUTION**

R. G. Ball (Naval Postgraduate School)

Aug. 1972

**LANGLEY-11109**

Computer program on axisymmetric response of shells with other meridional geometries and response of shells subjected to asymmetric loads is described. Description of theory, method of solution, instructions for preparing input data, and two sample problems to illustrate data preparation and output format are included.

**B72-10568****HIGH SPEED SEQUENTIAL DECODER**

K. S. Gilhousen (Linkabit Corp.)

Sep. 1972

**ARC-10657**

Operation of sequential decoding of data at high rates using Fano algorithm is discussed. Actions followed by decoder in systematically searching branches are described. Technique of diagonal steps is explained and illustrated.

**B72-10577****ANALYSIS AND COMPUTER PROGRAMS TO CALCULATE ACOUSTIC WAVE PROPERTIES OF BAFFLED CHAMBERS**

C. L. Oberg (N. Am. Rockwell Corp.), T. L. Wong (N. Am. Rockwell Corp.), and R. A. Schmeltzer (N. Am. Rockwell Corp.)

Sep. 1972

**LEWIS-11529**

Analytical methods and four computer programs have been developed for calculating wave motion in closed, baffled chambers

with rigid and non-rigid boundaries. Application of these methods to design of injector-face baffles in liquid propellant engines will provide significant insight into effects of baffles on combustion stability.

**B72-10582****COMPUTER METHOD FOR IDENTIFICATION OF BOILER TRANSFER FUNCTIONS**

J. H. Miles

Sep. 1972 See also NASA-TM-X-2436

**LEWIS-11808**

Iterative computer aided procedure was developed which provides for identification of boiler transfer functions using frequency response data. Method uses frequency response data to obtain satisfactory transfer function for both high and low vapor exit quality data.

**B72-10584****COMPUTER PROGRAMS FOR THE DESIGN OF LIQUID-TO-LIQUID JET PUMPS**

N. L. Sanger

Dec. 1972

**LEWIS-11679**

Computer programs based on one-dimensional equations for cavitating and noncavitating flow in liquid-to-liquid jet pumps are described.

**B72-10585****COMPUTER PROGRAM FOR FITTING LOW-ORDER POLYNOMIAL SPLINES BY METHOD OF LEAST SQUARES**

P. J. Smith

Sep. 1972

**LEWIS-11651**

FITLOS is computer program which implements new curve fitting technique. Main program reads input data, calls appropriate subroutines for curve fitting, calculates statistical analysis, and writes output data. Method was devised as result of need to suppress noise in calibration of multiplier phototube capacitors.

**B72-10586****COMPUTER PROGRAM FOR QUASI-THREE-DIMENSIONAL CALCULATION OF SURFACE VELOCITIES AND CHOKING FLOW FOR TURBOMACHINE BLADE ROWS**

T. Katsanis

Sep. 1972 See also NASA-TM-X-1394; NASA-TN-D-6177

**LEWIS-11635**

Computer program, CHANEL, can obtain quasi-three-dimensional solutions in any well-guided channel. Conditions that can be handled by program that could not be handled previously are nonuniform inlet temperature, pressure, prewhirl, nonaxial flow where meridional flow angle, meridional stream-line curvature, and radius can vary as desired from hub to tip.

**B72-10589****REDUNDANT DATA MANAGEMENT SYSTEM**

J. R. Hall (McDonnell-Douglas Corp.)

Sep. 1972

**M-FS-21831**

Redundant data management system solves problem of operating redundant equipment in real time environment where failures are detected, isolated, and switched in simple manner. System consists of quadruply-redundant computer, input/output control units, and data bases. System inherently contains failure detection, isolation, and switching function.

**B72-10599****SYSTEM/360 COMPUTER ASSISTED NETWORK SCHEDULING (CANS) SYSTEM**

A. C. Brewer (IBM)

Oct. 1972

**GSFC-10909**

Computer assisted scheduling techniques that produce conflict-free and efficient schedules have been developed and implemented to meet needs of the Manned Space Flight Network. CANS system provides effective management of resources in complex scheduling environment. System is automated resource

## 09 COMPUTER PROGRAMS

scheduling, controlling, planning, information storage and retrieval tool.

### **B72-10600 SIGNIFICANCE ARITHMETIC EXPERIMENTAL PACKAGE (SIGPAC)**

I. Cole (Computation Planning, Inc.)

Oct. 1972

GSFC-11499

Method for use by computing facility to determine accuracy of computer calculations is presented. Primary goals of error analysis program are described. Program is designed for both FORTRAN 4 and ASSEMBLER for use with IBM 360 computer.

### **B72-10601 STUDY OF HIGH ALTITUDE PLUME IMPINGEMENT**

C. J. Wojciechowski (Lockheed Missiles and Space Co.), M. M. Penny (Lockheed Missiles and Space Co.), R. J. Prozan (Lockheed Missiles and Space Co.), D. Seymour (Lockheed Missiles and Space Co.), and T. F. Greenwood (Lockheed Missiles and Space Co.)

Oct. 1972

M-FS-21414

Computer program has been developed as analytical tool to predict severity of effects of exhaust of rocket engines on adjacent spacecraft surfaces. Program computes forces, moments, pressures, and heating rates on surfaces immersed in or subjected to exhaust plume environments. Predictions will be useful in design of systems where such problems are anticipated.

### **B72-10602 PROGRAM FOR STANDARD STATISTICAL DISTRIBUTIONS**

L. W. Falls

Oct. 1972

M-FS-21466

Development of procedure to describe frequency distributions involved in statistical theory is discussed. Representation of frequency distributions by first order differential equation is presented. Classification of various types of distributions based on Pearson parameters is analyzed.

### **B72-10604 INTERPLANETARY TRAJECTORIES, ENCKE METHOD (ITEM)**

F. H. Whitlock, H. Wolfe (Anal. Mech. Associates, Inc.), L. Lefton (Anal. Mech. Associates, Inc.), and N. Levine (Anal. Mech. Associates, Inc.)

Oct. 1972

GSFC-11576

Modified program has been developed using improved variation of Encke method which avoids accumulation of round-off errors and avoids numerical ambiguities arising from near-circular orbits of low inclination. Variety of interplanetary trajectory problems can be computed with maximum accuracy and efficiency.

### **B72-10605 PROPULSION SIZING PROGRAM**

T. A. Kaemming (McDonnell-Douglas Corp.) and A. E. Burns (McDonnell-Douglas Corp.)

Oct. 1972

MSC-14016

Computer program was written to evaluate and define optimum design parameters of low pressure auxiliary propulsion system. APS will provide attitude and translational control of space shuttle vehicles. Program evaluates subsystem design parameters such as engine chamber pressure, mixture ratio, expansion ratio, and subsystem component weight and size.

### **B72-10606 PROGRAM TO PRODUCE HORIZONTAL STEREOGRAPHIC PRINT MAPS FROM NIMBUS HRIR DATA**

H. W. Powell (Programming Methods, Inc.)

Oct. 1972

GSFC-11397

Computer program is written to display Nimbus high resolution

infrared radiometer data in optimum form for experiment usage. Program produces three maps for Nimbus experimental data. Functions of program are to process data and prepare print maps from modified temperature measurements.

### **B72-10607 AUTOMATIC COMPUTER SUBPROGRAM SELECTION FROM APPLICATION-PROGRAM LIBRARIES - ALTLIB**

J. M. Drozdowski

Oct. 1972

LANGLEY-11124

General purpose computer program for access and use of alternate library file with minimum programming effort by user is described. Manner in which program is implemented after determining external requirements is analyzed. Program was developed for use with CDC-6400 computer.

### **B72-10608 TWO AUTOWIRE VERSIONS FOR CDC-3200 AND IBM-360**

J. B. Billingsley

Oct. 1972

GSFC-11526; GSFC-11539

Microelectronics program was initiated to evaluate circuitry, packaging methods, and fabrication approaches necessary to produce completely procured logic system. Two autowire programs were developed for CDC-3200 and IBM-360 computers for use in designing logic systems.

### **B72-10610 COMPUTER PROGRAM ANALYZES AND MONITORS ELECTRICAL POWER SYSTEMS (POSIMO)**

K. Jaeger (Ges. fuer Weltraumforsch., Bonn)

Oct. 1972

GSFC-11505

Requirements to monitor and/or simulate electric power distribution, power balance, and charge budget are discussed. Computer program to analyze power system and generate set of characteristic power system data is described. Application to status indicators to denote different exclusive conditions is presented.

### **B72-10614 SPECTRAL ANALYSIS OF MULTIPLE TIME SERIES**

M. R. Dubman (N. Am. Rockwell Corp.)

Oct. 1972

M-FS-18859

Application of spectral analysis for mathematically determining relationship of random vibrations in structures and concurrent events in electric circuits, physiology, economics, and seismograms is discussed. Computer program for performing spectral analysis of multiple time series is described.

### **B72-10618 VORTEX-LATTICE FORTRAN PROGRAM FOR ESTIMATING SUBSONIC AERODYNAMIC CHARACTERISTICS OF COMPLEX PLANFORMS**

R. J. Margason and J. E. Lamar

Oct. 1972

LANGLEY-11047

Computer program for estimating subsonic aerodynamic characteristics of various aerodynamic configurations is presented. Program represents lifting planforms with vortex-lattice. Specific aerodynamic characteristics to be determined are described. Examples and typical running times of various types of configurations are provided.

### **B72-10619 SOURCE DECK COMPRESSION AND UPDATE PROGRAM (CAPS)**

E. O. Merrill (Programming Methods, Inc.)

Oct. 1972

GSFC-11545

Computer program for compressing program source decks and other data coded in Hollerith format is described. Compression of card image record by substitution of special code characters

is discussed. Program is written for IBM 360/75/95 Release 19 computer.

#### B72-10620

##### GPEDIT

J. B. Dash (Computer Appl., Inc.)

Dec. 1972

GSFC-11308

GPEDIT compares each character in data record to corresponding character in mask provided by user. Mask indicates that alphabetic or numeric character is allowed or that blank or punctuation mark is anticipated. Mask can also indicate that any data character other than some invalid character is allowed.

#### B72-10621

##### WATER IMPACT LOADS

D. H. Sanders (McDonnell-Douglas Corp.) and S. G. Safronski (McDonnell-Douglas Corp.)

Oct. 1972

M-FS-21955

Computer program to generate time history of load factor and pressure on conical body of revolution during impact with water is discussed. Program calculates depth of penetration, velocity, force, load factor, maximum pressure at water line, and average pressure. Program is written in FORTRAN 4 Level. H for IBM 360/85/195 Release 20.1 computer.

#### B72-10622

##### METHOD FOR NONLINEAR EXPONENTIAL REGRESSION ANALYSIS

B. G. Junkin

Oct. 1972

M-FS-21965

Two computer programs developed according to two general types of exponential models for conducting nonlinear exponential regression analysis are described. Least squares procedure is used in which the nonlinear problem is linearized by expanding in a Taylor series. Program is written in FORTRAN 5 for the Univac 1108 computer.

#### B72-10623

##### FORTMAN MANPOWER ACCOUNT PROGRAM

J. N. Strand

Oct. 1972

NPO-11973

Computer program for determining manpower costs for full time, part time, and contractor personnel is discussed. Twelve different tables resulting from computer output are described. Program is written in FORTRAN 4 for IBM 360/65 computer.

#### B72-10624

##### COMPUTER PROGRAM TO GENERATE ATTITUDE ERROR EQUATIONS FOR A GIMBALLED PLATFORM

W. A. Hall, Jr. (IBM), T. D. Morris (IBM), and K. Y. Rone (IBM)

Oct. 1972

M-FS-21991

Computer program for solving attitude error equations related to gimballed platform is described. Program generates matrix elements of attitude error equations when initial matrices and trigonometric identities have been defined. Program is written for IBM 360 computer.

#### B72-10625

##### PROGRAM TO REDUCE THE SIZE OF STRUCTURAL MATRICES

H. W. Spurlin (N. Am. Rockwell Corp.) and R. Heckenlaible (N. Am. Rockwell Corp.)

Dec. 1972

MSC-17619

Computer program was developed to reduce both mass and stiffness matrices by eliminating degrees of freedom using Cholesky decomposition. Program is written in FORTRAN G or H for IBM 360 computer.

#### B72-10634

##### COMPUTER PROGRAM FOR AFTERHEAT TEMPERATURE

#### DISTRIBUTION FOR MOBILE NUCLEAR POWER PLANT

W. G. Parker (Westinghouse) and L. E. VanBibber (Westinghouse)

Dec. 1972

LEWIS-11693

ESATA computer program was developed to analyze thermal safety aspects of post-impacted mobile nuclear power plants. Program is written in FORTRAN 4 and designed for IBM 7094/7044 direct coupled system.

#### B72-10648

##### VIBRATIONAL TRANSFER FUNCTIONS FOR COMPLEX STRUCTURES

P. A. Jones (Martin Marietta Corp.) and R. L. Berry (Martin Marietta Corp.)

Oct. 1972

M-FS-20744

Evaluation of effects of vibrational multiple frequency forcing functions is discussed. Computer program for developing vibrational transfer functions is described. Possible applications of computer program are enumerated.

#### B72-10650

##### PROGRAM FOR CREATING AN OPERATING SYSTEM GENERATION CROSS REFERENCE INDEX (SGINDEX)

C. W. Barth

Oct. 1972

GSFC-11612

Computer program to collect key data from Stage Two input of OS/360 system and to prepare formatted listing of index entries collected is discussed. Program eliminates manual paging through system output by providing comprehensive cross reference.

#### B72-10656

##### ANALYTIC PROCEDURES FOR DETERMINING DIMENSIONAL REDUNDANCIES IN ELECTRONIC DEVICES

G. J. Herskowitz (Stevens Inst. of Tech.)

Oct. 1972

HQ-10709

Methods for ascertaining dimensional redundancies in mathematical functions related to electronic phenomena and for removal of redundancies are presented. Two computer programs, one to determine a complete B-matrix and the other to optimize the matrix, are discussed. Three subroutines are analyzed.

#### B72-10667

##### NUMERICAL SOLUTION OF POTENTIAL FLOW PROBLEMS IN TERMS OF FLUX COMPONENTS

D. U. VonRosenberg (Tulane Univ.)

Dec. 1972

M-FS-21751

Numerical determination of flux components in vapor flow considers split boundary conditions in both directions to form grid lines for flow continuity equations. Matrix of coefficients obtains direct solution for potential flow problem without iteration.

#### B72-10671

##### A LINEAR PROGRAMMING MANUAL

R. C. Tvey (Informatics TISCO, Inc.)

Dec. 1972

HQ-10743

Computer solutions of linear programming problems are outlined. Information covers vector spaces, convex sets, and matrix algebra elements for solving simultaneous linear equations. Dual problems, reduced cost analysis, ranges, and error analysis are illustrated.

#### B72-10674

##### GEOMETRIC FIELD-LINE CALCULATIONS

E. G. Stassinopoulos and G. D. Mead

Oct. 1972

GSFC-11597

Procedure for calculating three components of vector field from spherical harmonic using either geocentric or geodetic coordinates as input and output is described. Three subroutines



## 09 COMPUTER PROGRAMS

of computer program are explained. Program is written in FORTRAN for IBM 360 computer.

**B72-10675**

### **MATHEMATICAL ANALYSIS FOR THE PERFORMANCE ASSESSMENT OF SPACE COMMUNICATION PARAMETERS, IBM-360 VERSION**

L. Grayson (Computer Sci. Corp.)

Dec. 1972

**GSFC-11523**

Development of equations to determine communication capability of pulse or digital transmission link is discussed. Equation specifies probability detection error for one-way transmission. Analysis is conducted on IBM 360 computer using FORTRAN 4.

**B72-10676**

### **INTEGRATED MULTI-PATH PROGRAM ANALYSIS AND COST TECHNIQUE (IMPACT)**

O. Sullivan

Dec. 1972

**M-FS-21880**

SDS-930 computer determines impact cost-decision value at any chronological point in definition phase of multiprogram project. Options, option combinations, and different displays are listed. Graphical procedure was chosen as best method for project.

**B72-10718**

### **COMPUTER PROGRAM FOR CALCULATION OF COMPLEX CHEMICAL EQUILIBRIUM COMPOSITIONS**

S. Gordon and B. J. McBride

Dec. 1972

**LEWIS-11714; LEWIS-11740**

Computer program is described for numerical solution of chemical equilibria in complex systems by using nonlinear algebraic equations. Free-energy minimization technique is used.

**B72-10721**

### **CHRYSLER IMPROVED NUMERICAL DIFFERENCING ANALYZER FOR THIRD GENERATION COMPUTERS CINDA-3G**

J. D. Gaski (Chrysler Corp.), D. R. Lewis (Chrysler Corp.), and L. R. Thompson (Chrysler Corp.)

Dec. 1972 See also B67-10278

**MSC-11653**

New and versatile method has been developed to supplement or replace use of original CINDA thermal analyzer program in order to take advantage of improved systems software and machine speeds of third generation computers. CINDA-3G program options offer variety of methods for solution of thermal analog models presented in network format.

**B72-10726**

### **OPTIMIZING DESIGNS OF TWO-LEVEL FACTORIAL EXPERIMENTS GIVEN PARTIAL PRIOR INFORMATION (NAMER)**

S. M. Sidik

Dec. 1972

**LEWIS-11708**

NAMER is used to find Bayes procedure for designing two level, fractional factorial experiments when given partial prior information. Program is written in FORTRAN 4 for IBM 7094 computer.

**B72-10736**

### **SINDA, SYSTEMS IMPROVED NUMERICAL DIFFERENCING ANALYZER**

L. C. Fink (TRW Systems Group), H. M. -Y. Pan (TRW Systems Group), and T. Ishimoto (TRW Systems Group)

Dec. 1972

**MSC-13805**

Computer program has been written to analyze group of 100-node areas and then provide for summation of any number of 100-node areas to obtain temperature profile. SINDA program options offer user variety of methods for solution of thermal analog modes presented in network format.

**B72-10739**

### **AEROTHERM CHEMICAL EQUILIBRIUM (ACE) COMPUTER PROGRAM**

C. A. Powars (Aerotherm Corp.) and R. M. Kendall (Aerotherm Corp.)

Dec. 1972

**LEWIS-11722**

Computer code was developed for calculating chemical quantities and qualities in equilibrium.

**B72-10747**

### **THREE BIT MASS SPECTRAL SEARCH PROGRAM**

S. L. Grotch

Dec. 1972

**NPO-11960**

Computer program is developed to interpret spectral data in order to assist chemist in identifying low resolution mass spectra. Two versions of program, using approximately same amount of core, are available. In both programs, core requirements are roughly proportional to maximum number of unknowns to be handled on each pass through tape.

**B72-10750**

### **FORTAN READ PACKAGE**

D. P. Diekelman (McDonnell-Douglas Corp.)

Dec. 1972

**MSC-14161**

Flexible input schemes for digital programs are described. No card format or special order of cards is required. Read package is controlled by small set of parameters which can be changed to account for differences in computers and digital programs.

**B72-10753**

### **FORTAN PROGRAM FOR GENERATING A TWO-DIMENSIONAL ORTHOGONAL MESH BETWEEN TWO ARBITRARY BOUNDARIES**

W. D. McNally

Dec. 1972

**LEWIS-11863**

Computer program is described which computes and plots coordinates for two-dimensional orthogonal mesh for channel containing solid body, about which flow passes and which spans channel from one wall to the other.

# SUBJECT INDEX

## Subject Index

The title of each Tech Brief is listed under several selected subject headings to provide the user with a variety of approaches in his search for specific information. The Tech Brief number, e.g., B72-10097, is located under and to the right of the title and is followed by a two-digit number, e.g., 04, which designates the subject category in which the entire entry can be found.

## A

### ABLATION

Program for the transient response of ablating axisymmetric bodies including the effects of shape change

LANGLEY-11049 B72-10068 09

### ABLATIVE MATERIALS

Program for the transient response of ablating axisymmetric bodies including the effects of shape change

LANGLEY-11049 B72-10068 09

Chemical modification of poly(p-phenylene) for use in ablative compositions

ARC-10135 B72-10451 04

### ABNORMALITIES

Simple non-destructive tests for electroexplosive devices

NPO-11563 B72-10315 01

### ABRASION

High strength, medium density molded foam

AEC-10053 B72-10235 04

Polishing is made cheaper by disposable diamond-impregnated abrasive cloth

MSC-14247 B72-10616 08

### ABRASION RESISTANCE

Sheet plastic filters for solar cells

NPO-11464 B72-10090 04

Nonflammable and abrasion resistant coating process for glass fibers

MSC-14024 B72-10445 08

### ABRASIVES

Sintered diamond compacts using metallic cobalt binders

HQ-10706 B72-10519 04

### ABSORBENTS

Comparison of catalyst activity

ARC-10493 B72-10201 04

Solid amine compounds as sorbents for carbon dioxide: A concept

ARC-10571 B72-10421 04

### ABSORBERS (MATERIALS)

Solid amine compounds as sorbents for carbon dioxide: A concept

ARC-10571 B72-10421 04

### ABSORPTION

Space-suit carbon dioxide absorption system: A concept

ARC-10546 B72-10168 05

Nondispersive infrared analyzer for specific gases in complex mixtures

ARC-10308 B72-10198 03

Carbon dioxide concentration indicator

HQ-10582 B72-10526 05

Improved sampling of compressed gases for condensable hydrocarbon content

KSC-10304 B72-10540 06

### ABSORPTION SPECTRA

Direct analysis of hydrogen/deuterium mixtures: A concept

NPO-11322 B72-10244 03

An absorption spectrum amplifier for determining gas composition

HQ-10752 B72-10524 03

### ABSORPTION SPECTROSCOPY

An absorption spectrum amplifier for determining gas composition

HQ-10752 B72-10524 03

### ABSORPTIVITY

Water purification by reverse osmosis using heterocyclic polymer membranes

LANGLEY-10514 B72-10230 04

Measurement of electron density and temperature in plasmas

ARC-10598 B72-10563 03

### ACCELERATION (PHYSICS)

Balanced-bellows spirometer

XAC-01547 B72-10279 05

Linear accelerator: A concept

KSC-10618 B72-10636 06

### ACCELERATION PROTECTION

Peak acceleration limiter

NPO-10556 B72-10007 01

### ACCELEROMETERS

Control of acceleration in sine/random vibration tests

NPO-11482 B72-10091 02

Inertial reference unit

NPO-11518 B72-10094 02

Gravitational gradiometer measures mass changes

M-FS-20814 B72-10140 03

### ACCIDENT PREVENTION

High voltage protection network

ARC-10197 B72-10119 02

Technical management techniques for identification and control of industrial safety and pollution hazards

M-FS-21883 B72-10588 05

Seat belt restraint system

ARC-10519 B72-10692 06

### ACCUMULATORS

Coaxial inverted geometry epitaxial transistor

ARC-10330 B72-10056 01

Flexible desk top computers using Large Scale Integration (L.S.I.) chips

M-FS-21277 B72-10112 01

High efficiency collector for microwave tubes

LEWIS-11192 B72-10259 03

### ACCURACY

Improved laboratory gradiometer can be a field survey instrument

MSC-13980 B72-10001 03

Third order digital-to-analog converter

MSC-12458 B72-10030 02

Low temperature scale for a 1 to 20 degree Kelvin region

AEC-10007 B72-10146 03

Snap dynamics

M-FS-21531 B72-10265 09

Small turbine-type flowmeters for liquid hydrogen

LEWIS-11535 B72-10331 06

Precision machining of steel decahedrons

M-FS-21361 B72-10597 07

Magnetometer uses bismuth-selenide

LEWIS-11632 B72-10629 03

### ACETATES

Water purification by reverse osmosis using heterocyclic polymer membranes

LANGLEY-10514 B72-10230 04

### ACETIC ACID

Covalent bonding of antibodies of polystyrene latex beads: A concept

MSC-13906 B72-10006 05

### ACETONE

Promotion of dropwise condensation of ethyl alcohol, methyl alcohol, and acetone by polytetrafluoroethylene

LANGLEY-10940 B72-10115 04

### ACIDS

New type of trifunctional alcohol

NPO-10714 B72-10553 04

### ACOUSTIC EXCITATION

Response of a panel structure to reverberant acoustic excitation

M-FS-21774 B72-10603 06

### ACOUSTIC MEASUREMENTS

Acoustic spectral analysis and testing techniques

NPO-11554 B72-10341 03

Acoustic emission used as weld quality monitor

AEC-10018 B72-10427 08

Acoustical analysis system

GSFC-11087 B72-10751 02

Automated analysis of blood pressure measurements (Korotkov sound)

MSC-13999 B72-10756 05

### ACOUSTIC PROPERTIES

Improved audio reproduction system

ARC-10404 B72-10059 01

## ACOUSTIC VELOCITY

Continuous monitor for gas ratios in a mixture

LEWIS-11095 872-10229 05

## ACOUSTICS

Reduction of fan noise: A concept

ARC-10312 872-10040 06

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MSC-17457 872-10076 02

Low temperature scale for a 1 to 20 degree Kelvin region

AEC-10007 872-10146 03

Evaluation of jet engine noise

M-FS-21416 872-10263 03

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NPO-11554 872-10341 03

## ACOUSTO-OPTICS

Acousto-optic filter for electronic laser tuning

HQ-10715 872-10520 03

## ACRYLIC RESINS

Strengthening lightweight concrete

AEC-10017 872-10430 04

## ACRYLONITRILES

Fire retardant polyisocyanurate foam

ARC-10280 872-10269 04

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A process yields large quantities of pure ribosome subunits

HQ-10662 872-10653 05

## ACTUATION

Ferromagnetic-fluid logic devices

ARC-10503 872-10011 06

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Propellant-powered actuator for gas generators

ARC-10484 872-10008 03

Electrodynamical actuators for rocket engine valves

ARC-10486 872-10009 06

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ARC-10505 872-10013 06

A hybrid electromechanical solid state switch for ac power control

MSC-14005 872-10018 02

Beryllium thin films for resistor applications

ARC-10485 872-10021 01

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NPO-11527 872-10096 01

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LANGLEY-11071 872-10663 06

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ARC-10294 872-10055 01

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ARC-10415 872-10062 05

Halogenation of microcapsule walls

ARC-10410 872-10161 04

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M-FS-21410 872-10318 04

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## ADHESION

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AEC-10083 872-10231 04

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AEC-10053 872-10235 04

Development of a polyimide for use as a temperature and solvent resistant sealant

M-FS-21325 872-10262 04

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LEWIS-11047 872-10038 04

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NPO-10034 872-10492 01

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ARC-10459 872-10063 04

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ARC-10007 872-10191 02

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MSC-17668 872-10284 04

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 Frequency-to-amplitude converter: A concept  
 MSC-12395 B72-10729 01

**ANALOGS**  
 FORTRAN program for generating a two-dimensional orthogonal mesh between two arbitrary boundaries  
 LEWIS-11863 B72-10753 09

**ANALYSIS (MATHEMATICS)**  
 Indefinite integrals of products of some exponential and trigonometric functions  
 LEWIS-11493 B72-10225 09  
 Prediction of flow-induced failures of braided flexible hoses and bellows  
 M-FS-19004 B72-10407 06  
 Roll function in a flight simulator  
 ARC-10557 B72-10417 02

**ANALYZERS**  
 Nondispersive infrared analyzer for specific gases in complex mixtures  
 ARC-10308 B72-10198 03

**ANGLE OF ATTACK**  
 Mislift and miss-drag programs  
 LANGLEY-10932 B72-10153 09

**ANGLES (GEOMETRY)**  
 Sensitive holographic detection of small aerodynamic perturbations  
 ARC-10422 B72-10209 03  
 An improved apochromatic wedge utilizing optical molecular contact bonding  
 GSFC-11082 B72-10388 03

**ANGULAR ACCELERATION**  
 Angular velocity and acceleration meter  
 LEWIS-11466 B72-10183 06

**ANGULAR DISTRIBUTION**  
 Redirecting electromagnetic beams through wide angles  
 ARC-10602 B72-10307 03

**ANGULAR VELOCITY**  
 Angular velocity and acceleration meter  
 LEWIS-11466 B72-10183 06

## ANTIFRICTION BEARINGS

Redirecting electromagnetic beams through wide angles  
 ARC-10602 B72-10307 03

**ANILINE**  
 A stable liquid crystal for electro-optical displays  
 HQ-10714 B72-10746 04

**ANIMALS**  
 Implanted telemeter for electrocardiogram and body temperature  
 XAC-08505 B72-10035 05  
 Programmed physiological infusion system  
 ARC-10447 B72-10126 05  
 Real-time pair-feeding of animals  
 ARC-10302 B72-10298 05  
 An efficient, simple dialyzer  
 HQ-10741 B72-10522 05  
 A thermocouple thermode for small animals  
 ARC-10550 B72-10559 05

**ANNEALING**  
 Proposed semiconductor film improvement  
 HQ-10685 B72-10438 04

**ANNULAR PLATES**  
 Annular objective apertures improve resolution of electron microscopes  
 ARC-10448 B72-10171 03

**ANODES**  
 A liquid radiation detector with high spatial resolution  
 MSC-13965 B72-10034 03  
 Electrodes for sealed secondary batteries  
 ARC-10238 B72-10050 02  
 High-temperature, long-life thyratron  
 LEWIS-11327 B72-10134 01  
 Cell for electrolysis of water vapor  
 ARC-10521 B72-10166 03  
 Silver-chlorine fuel cell: A concept  
 ARC-10491 B72-10221 03  
 Improved high-performance shock tube  
 NPO-11885 B72-10242 03  
 Ion plating seals microcracks or porous metal components  
 LEWIS-11657 B72-10397 04  
 Al/Ci2 molten salt battery  
 HQ-10696 B72-10527 01

**ANTENNA ARRAYS**  
 Redirecting electromagnetic beams through wide angles  
 ARC-10602 B72-10307 03

**ANTENNAS**  
 Implanted telemeter for electrocardiogram and body temperature  
 XAC-08505 B72-10035 05  
 Deep space network  
 NPO-11562 B72-10043 01  
 Remote measurement of the water content of snowpacks  
 ARC-10651 B72-10567 03

**ANTIBODIES**  
 Covalent bonding of antibodies of polystyrene latex beads: A concept  
 MSC-13906 B72-10006 05

**ANTIFRICTION BEARINGS**  
 Space suit may have orthotic applications  
 ARC-10275 B72-10297 05  
 Ball bearing protector  
 M-FS-21612 B72-10322 07  
 Simple turbine balancing test apparatus  
 LEWIS-11658 B72-10377 07

- Design criteria monograph for high-load high-speed rolling-contact bearings  
LEWIS-11823 B72-10627 04
- New detection method for rolling element and bearing defects  
M-FS-21911 B72-10689 06
- APERTURES**
- Mass separator for low velocity ions  
ARC-10375 B72-10123 03
- Annular objective apertures improve resolution of electron microscopes  
ARC-10448 B72-10171 03
- Vortex servovalve for fluidic or electrical input  
ARC-10155 B72-10173 07
- APPLICATIONS OF MATHEMATICS**
- Mathematical techniques for estimating operational readiness of complex systems  
MSC-17694 B72-10335 09
- Variable boundary II heat conduction  
LEWIS-10679 B72-10444 09
- Computer program analyzes and monitors electrical power systems (POSIMO)  
GSFC-11505 B72-10610 09
- Method for nonlinear exponential regression analysis  
M-FS-21965 B72-10622 09
- Computer program to generate attitude error equations for a gimbaled platform  
M-FS-21991 B72-10624 09
- APPROACH CONTROL**
- Aircraft communication via telefacsimile system  
M-FS-20839 B72-10139 02
- APPROXIMATION**
- Cubic spline functions for curve fitting  
LRL-10034 B72-10311 09
- AQUEOUS SOLUTIONS**
- Stabilization of lactate dehydrogenase  
ARC-10415 B72-10062 05
- Particle detection by a light-scattering technique  
ARC-10384 B72-10160 03
- Carbon dioxide concentrator  
ARC-10245 B72-10194 05
- Electron beam chemistry produces high purity metals  
LEWIS-11639 B72-10439 04
- Nonflammable and abrasion resistant coating process for glass fibers  
MSC-14024 B72-10445 08
- ARC HEATING**
- Pulsed high-power arc heater with improved cathode and triggering mechanism  
ARC-10173 B72-10048 03
- ARC LAMPS**
- A dual-beam actinic light source for photosynthesis research  
ARC-10351 B72-10205 05
- ARC WELDING**
- Analysis of thermal stress and metal movement during welding  
M-FS-20984 B72-10333 04
- ARCHITECTURE**
- Techniques for improving reliability of computers  
M-FS-21326 B72-10109 02
- Fabrication of carbon film composites for high-strength structures  
ARC-10613 B72-10423 04
- ARGON**
- A liquid radiation detector with high spatial resolution  
MSC-13965 B72-10034 03
- Long-term drift of thermocouples at 1600 K  
LEWIS-11471 B72-10176 01
- Diatomic infrared gasdynamic laser permits selection of wavelengths  
ARC-10370 B72-10206 03
- A sensitive image intensifier which uses inert gas  
LRL-10024 B72-10312 03
- Plasma calcining of pigment particles for thermal control coatings  
M-FS-21267 B72-10320 04
- Ion plating seals microcracks or porous metal components  
LEWIS-11657 B72-10397 04
- Proposed semiconductor film improvement  
HQ-10685 B72-10438 04
- Metastable atom probe for measuring electron beam density profiles  
M-FS-21593 B72-10485 03
- Sputter etching of hemispherical bearings  
HQ-10712 B72-10534 08
- ARITHMETIC AND LOGIC UNITS**
- Flexible desk top computers using Large Scale Integration (L.S.I.) chips  
M-FS-21277 B72-10112 01
- ARMATURES**
- Solenoid-operated swing-check valve  
XAC-10048 B72-10037 06
- A brushless dc spin motor for momentum exchange altitude control  
M-FS-14952 B72-10448 02
- AROMATIC COMPOUNDS**
- Ultraviolet and thermally stable polymer compositions  
ARC-10592 B72-10709 04
- ARRAYS**
- Sheet plastic filters for solar cells  
NPO-11464 B72-10090 04
- Interconnections for fluidic circuits  
ARC-10481 B72-10164 02
- Flexible, low-cost silicon solar cell arrays  
LEWIS-11069 B72-10177 02
- ARTERIES**
- Electronic circuit detects left ventricular ejection events in cardiovascular system  
LEWIS-11581 B72-10512 05
- ASBESTOS**
- Carbon dioxide concentrator  
ARC-10245 B72-10194 05
- Hydrogen eliminator  
ARC-10408 B72-10208 03
- ASSEMBLER ROUTINES**
- Significance arithmetic experimental package (SIGPAC)  
GSFC-11499 B72-10600 09
- Program to produce horizontal stereographic print maps from Nimbus HRIR data  
GSFC-11397 B72-10606 09
- Two autowire versions for CDC-3200 and IBM-360  
GSFC-11526 B72-10608 09
- ASSEMBLIES**
- Ferromagnetic-fluid logic devices  
ARC-10503 B72-10011 06
- Pressure-probe assembly for wind tunnels  
ARC-10569 B72-10248 03
- ASTRONAUT PERFORMANCE**
- Space-suit carbon dioxide absorption system: A concept  
ARC-10546 B72-10168 05
- ASTRONOMY**
- Sunspot analysis and prediction  
M-FS-21724 B72-10317 03
- ATMOSPHERIC CHEMISTRY**
- Atmospheric density variations related to internal gravity waves  
M-FS-21637 B72-10143 03
- ATMOSPHERIC CIRCULATION**
- Cell for electrolysis of water vapor  
ARC-10521 B72-10166 03
- Aircrew oxygen system  
ARC-10247 B72-10195 05
- ATMOSPHERIC COMPOSITION**
- Mercury in the environment  
AEC-10048 B72-10233 05
- Self-calibrating remote atmospheric electromagnetic probe and data acquisition system  
M-FS-21212 B72-10665 03
- ATMOSPHERIC DENSITY**
- Atmospheric density variations related to internal gravity waves  
M-FS-21637 B72-10143 03
- ATMOSPHERIC ELECTRICITY**
- Lightning flash detection system  
ARC-10562 B72-10272 02
- ATMOSPHERIC ENTRY**
- Optimized braking of landing vehicles with atmospheric drag  
NPO-11402 B72-10084 06
- Improved high-performance shock tube  
NPO-11885 B72-10242 03
- ATMOSPHERIC HEATING**
- Atmospheric density variations related to internal gravity waves  
M-FS-21637 B72-10143 03
- ATMOSPHERIC PRESSURE**
- Hydrogen eliminator  
ARC-10408 B72-10208 03
- ATMOSPHERIC TURBULENCE**
- Atmospheric density variations related to internal gravity waves  
M-FS-21637 B72-10143 03
- Program to determine space vehicle response to wind turbulence  
M-FS-21614 B72-10410 09
- ATOMIC WEIGHTS**
- An empirical relationship for the penetration of 1 to 3 MeV electrons  
LEWIS-11495 B72-10144 04
- ATTACHMENT**
- Properties of ionization breakdown of air at microwave frequencies and optimization of component dimensions for maximum microwave power  
M-FS-21924 B72-10316 01
- Quick-donning backpack harness  
LANGLEY-10102 B72-10641 05
- ATTITUDE CONTROL**
- Pressure sensitive gas flow meter  
ARC-10219 B72-10049 06
- Adaptive position control loop  
ARC-10255 B72-10052 02
- Inertial reference unit  
NPO-11518 B72-10094 02
- Driver circuit for inductive loads  
ARC-10073 B72-10268 01
- ATTITUDE STABILITY**
- Wide angle solar sensor  
NPO-11341 B72-10080 01
- AUDIO EQUIPMENT**
- An absentee monitoring device  
KSC-10668 B72-10578 01
- AUDIO FREQUENCIES**
- Improved audio reproduction system  
ARC-10404 B72-10059 01

**AUDITORY SIGNALS**

- A sonic transducer to detect fluid leaks  
KSC-10704 B72-10376 01
- An absentee monitoring device  
KSC-10668 B72-10578 01

**AUDITORY STIMULI**

- An absentee monitoring device  
KSC-10668 B72-10578 01
- Loudness (annoyance), prediction procedure for steady sounds  
LEWIS-11761 B72-10579 05

**AURORAS**

- Atmospheric density variations related to internal gravity waves  
M-FS-21637 B72-10143 03
- Sunspot analysis and prediction  
M-FS-21724 B72-10317 03

**AUTOCLAVES**

- Low-void polyimide resins for autoclave processing  
LEWIS-11665 B72-10728 04

**AUTOCLAVING**

- Heart catheter cable and connector  
ARC-10406 B72-10200 05
- Titanium reinforced boron polyimide composite  
M-FS-21916 B72-10353 04

**AUTOMATIC CONTROL**

- Real-time pair-feeding of animals  
ARC-10302 B72-10298 05
- A valve concept for remote fluid flow control  
M-FS-16097 B72-10400 07
- Automatic air flow control in air conditioning ducts  
GSFC-11445 B72-10490 06
- Automatic agar tray inoculation device  
LANGLEY-11074 B72-10637 05
- A proposed remote manipulator system: A concept  
MSC-14245 B72-10733 06

**AUTOMATIC CONTROL VALVES**

- Automatic water inventory, collecting, and dispensing unit  
LANGLEY-11071 B72-10663 06

**AUTOMATIC GAIN CONTROL**

- Low phase-shift amplifier  
NPO-11663 B72-10185 01
- Acoustical analysis system  
GSFC-11087 B72-10751 02

**AUTOMATION**

- A system for automatic analysis of blood pressure data for digital computer entry  
LEWIS-11751 B72-10632 05
- Dual field alignment display and control for electron micropattern generator  
M-FS-22118 B72-10646 01

**AUTOMOBILES**

- Carbon monoxide oxidation rates computed for automobile thermal reactor conditions  
LEWIS-11638 B72-10137 04
- A sonic transducer to detect fluid leaks  
KSC-10704 B72-10376 01

**AUXILIARY POWER SOURCES**

- Latch mechanism  
M-FS-21606 B72-10457 08

**AUXILIARY PROPULSION**

- Propulsion sizing program  
MSC-14016 B72-10605 09

**AVALANCHE DIODES**

- Gas leak-detection system  
NPO-11405 B72-10087 03

- Precision voltage regulator  
NPO-11502 B72-10092 01
- A simple tachometer circuit  
ARC-10603 B72-10308 01

**AXIAL FLOW PUMPS**

- A method for calculating the effects of design errors and measurement errors on pump performance  
LEWIS-11503 B72-10292 07

**AXIAL LOADS**

- Turbopump radial and axial rotor support system  
M-FS-21495 B72-10264 07

**AXIAL STRESS**

- Strain gage attachment by spot welding reduces the fatigue strength of Ti-6Al-4V, Rene 41, and Inconel X  
LANGLEY-10930 B72-10339 04

**AXISYMMETRIC BODIES**

- Program for the transient response of ablating axisymmetric bodies including the effects of shape change  
LANGLEY-11049 B72-10068 09
- Structural design and stress analysis program for advanced composite filament-wound axisymmetric pressure vessels (COMTANK)  
NPO-11943 B72-10073 09
- Computer program for calculating the temperature field of face seals  
LEWIS-11110 B72-10483 09

**AZINES**

- Ultraviolet and thermally stable polymer compositions  
ARC-10592 B72-10709 04

**B**

**BACKUPS**

- Strain gage attachment by spot welding reduces the fatigue strength of Ti-6Al-4V, Rene 41, and Inconel X  
LANGLEY-10930 B72-10339 04

**BACTERIA**

- Automatic agar tray inoculation device  
LANGLEY-11074 B72-10637 05

**BAFFLES**

- Baffle to confine glow discharge in ion pump  
M-FS-21575 B72-10324 03
- Efficient baffle prevents oil backstreaming in diffusion pumps  
LRL-10025 B72-10475 07
- Analysis and computer programs to calculate acoustic wave properties of baffled chambers  
LEWIS-11529 B72-10577 09
- A four-panel enclosure protects from explosion  
M-FS-21847 B72-10613 06

**BAGS**

- Counter lung  
ARC-10248 B72-10219 05

**BALANCE**

- Quartz crystal microbalance use in biological studies  
NPO-11346 B72-10243 05
- Simple turbine balancing test apparatus  
LEWIS-11658 B72-10377 07

**BALL BEARINGS**

- Low-friction ball-and-socket  
NPO-11348 B72-10081 08

- New full-complement ball bearing lubrication technique  
MSC-13850 B72-10174 07

- Ball bearing protector  
M-FS-21612 B72-10322 07

- A system for early warning of bearing failure  
M-FS-21877 B72-10494 06

- New detection method for rolling element and bearing defects  
M-FS-21911 B72-10689 06

**BALLISTIC TRAJECTORIES**

- Optimized braking of landing vehicles with atmospheric drag  
NPO-11402 B72-10084 06

**BALLS**

- A piezoelectrically actuated ball valve  
ARC-10338 B72-10204 06
- Machine finishes balls to high degree of roundness  
M-FS-21448 B72-10595 08

**BANDPASS FILTERS**

- Signal to noise measurement circuit  
GSFC-11239 B72-10102 01
- Solar sensor with autocollimator  
ARC-10148 B72-10192 03
- A sonic transducer to detect fluid leaks  
KSC-10704 B72-10376 01

**BANDWIDTH**

- Third order digital-to-analog converter  
MSC-12458 B72-10030 02
- Aircraft communication via telefacsimile system  
M-FS-20839 B72-10139 02
- Selecting digital filters  
M-FS-20933 B72-10156 01
- Differential input preamplifier  
ARC-10489 B72-10165 01
- Speed enhancement of complementary MOS devices  
ARC-10387 B72-10184 01
- Projections of scan patterns on human retina  
ARC-10181 B72-10193 05
- Acoustic spectral analysis and testing techniques  
NPO-11554 B72-10341 03
- A study of the power spectral density of an FM signal  
M-FS-21070 B72-10361 02
- Frequency-to-amplitude converter: A concept  
MSC-12395 B72-10729 01

**BATHS**

- Temperature control of a cryogenic bath  
HQ-10788 B72-10532 03

**BAYES THEOREM**

- Optimizing designs of two-level factorial experiments given partial prior information (NAMER)  
LEWIS-11708 B72-10726 09

**BEADS**

- Covalent bonding of antibodies of polystyrene latex beads: A concept  
MSC-13906 B72-10006 05

**BEAM LEADS**

- Development of chip passivated monolithic complementary MISFET circuits with beam leads  
M-FS-22264 B72-10696 01

**BEAM SPLITTERS**

- Liquid-helium-cooled Michelson interferometer  
ARC-10554 B72-10217 03



- Interferometric rotation sensor  
ARC-10278 B72-10274 03  
Optical device for producing color line scan display from monochrome oscilloscope traces  
LANGLEY-10896 B72-10375 03  
Unsupported thin film beam splitter  
GSFC-10525 B72-10471 02  
Oscillation of laser-beam intensity as observed with beam splitters  
ARC-10694 B72-10572 03
- BEAMS (RADIATION)**  
Conical electromagnetic radiation flux concentrator  
M-FS-21613 B72-10147 03
- BEAMS (SUPPORTS)**  
Remote weighing device  
M-FS-21556 B72-10325 07
- BEARING**  
Inorganic glass ceramic slip rings  
M-FS-20711 B72-10313 04
- BEARINGS**  
Lubricant selection for gear designers  
LEWIS-11483 B72-10136 04  
Common bearing material has highest fatigue life at moderate temperature  
LEWIS-11592 B72-10382 04  
Research on bearing lubricants for use in a high vacuum  
M-FS-22119 B72-10469 04  
Freon 21 bearing lubrication and coolant system  
HQ-10302 B72-10651 06  
High torque bellows seal rotary drive  
LEWIS-11813 B72-10681 07
- BELLOWS**  
Feedback control of variable conductance heat pipes  
ARC-10460 B72-10169 03  
Vortex servovalve for fluidic or electrical input  
ARC-10155 B72-10173 07  
Balanced-bellows spirometer  
XAC-01547 B72-10279 05  
Prediction of flow-induced failures of braided flexible hoses and bellows  
M-FS-19004 B72-10407 06  
Analytical failure determination of flow-induced fatigue in bellows  
M-FS-18178 B72-10488 06  
Improved high-temperature gimbal joint  
LEWIS-11705 B72-10489 06  
Linear accelerator: A concept  
KSC-10618 B72-10636 06  
High torque bellows seal rotary drive  
LEWIS-11813 B72-10681 07
- BELTS**  
Tool carrier  
M-FS-21469 B72-10319 07  
Quick-donning backpack harness  
LANGLEY-10102 B72-10641 05
- BENDING**  
Energy absorber uses expanded coiled tube  
AEC-10044 B72-10239 06  
Isogrid structure  
M-FS-21567 B72-10323 06  
Micro-scale crease-and-fold apparatus  
NPO-12029 B72-10552 06
- BERYLLIUM**  
Beryllium thin films for resistor applications  
ARC-10485 B72-10021 01
- BESSEL FUNCTIONS**  
Indefinite integrals of products of some exponential and trigonometric functions  
LEWIS-11493 B72-10225 09
- BIBLIOGRAPHIES**  
Design criteria monograph on turbopump inducers  
LEWIS-11824 B72-10635 08
- BIMETALS**  
Thermally stable structural framework  
ARC-10612 B72-10252 08  
A valve concept for remote fluid flow control  
M-FS-16097 B72-10400 07
- BINARY DATA**  
Speed enhancement of complementary MOS devices  
ARC-10387 B72-10184 01  
A simplified, compact static shift register  
HQ-10723 B72-10591 02  
Frequency-to-amplitude converter: A concept  
MSC-12395 B72-10729 01
- BINARY MIXTURES**  
Three bit mass spectral search program  
NPO-11960 B72-10747 09
- BINDERS (MATERIALS)**  
Research on bearing lubricants for use in a high vacuum  
M-FS-22119 B72-10469 04  
Sintered diamond compacts using metallic cobalt binders  
HQ-10706 B72-10519 04  
New type of trifunctional alcohol  
NPO-10714 B72-10553 04
- BIOACOUSTICS**  
Improved ultrasonic biomedical measuring apparatus  
ARC-10597 B72-10695 05
- BIOCHEMISTRY**  
Covalent bonding of antibodies of polystyrene latex beads: A concept  
MSC-13906 B72-10006 05  
Silver stain for electron microscopy  
ARC-10661 B72-10415 05
- BIOINSTRUMENTATION**  
Quartz crystal microbalance use in biological studies  
NPO-11346 B72-10243 05  
Blood pressure measurement and display system  
MSC-13036 B72-10334 05  
Improved ultrasonic biomedical measuring apparatus  
ARC-10597 B72-10695 05
- BIOLOGICAL EFFECTS**  
A process yields large quantities of pure ribosome subunits  
HQ-10662 B72-10653 05  
A study of radiation environment in space and its biological effects  
HQ-10798 B72-10662 03
- BIO Luminescence**  
A reusable prepositioned ATP reaction chamber  
HQ-10660 B72-10525 05
- BIOMEDICAL DATA**  
A system for automatic analysis of blood pressure data for digital computer entry  
LEWIS-11751 B72-10632 05  
Improved biomedical electrode  
MSC-13648 B72-10642 05
- BIOMETRICS**  
Improved biomedical electrode  
MSC-13648 B72-10642 05
- BIOPHYSICS**  
Improved ultrasonic biomedical measuring apparatus  
ARC-10597 B72-10695 05
- BIOTELEMETRY**  
Coaxial inverted geometry epitaxial transistor  
ARC-10330 B72-10056 01  
A differential ECG amplifier with single-ended output  
ARC-10411 B72-10061 05  
Narrowband, crystal-controlled biomedical telemetry system  
ARC-10708 B72-10255 01  
Protective encapsulation of implantable biotelemetry units  
ARC-10514 B72-10301 05
- BISMUTH**  
Manganese bismuth thin film for large capacity digital memories  
M-FS-21246 B72-10107 03
- BISMUTH ALLOYS**  
Removal of filler material from large high energy formed parts  
M-FS-16326 B72-10104 06
- BISMUTH COMPOUNDS**  
Magnetometer uses bismuth-selenide  
LEWIS-11632 B72-10629 03
- BIT SYNCHRONIZATION**  
An improved learning decoder  
MSC-14070 B72-10573 02
- BITS**  
Three bit mass spectral search program  
NPO-11960 B72-10747 09
- BLACK BODY RADIATION**  
Program to produce horizontal stereographic print maps from Nimbus HRIR data  
GSFC-11397 B72-10606 09
- BLAST DEFLECTORS**  
A four-panel enclosure protects from explosion  
M-FS-21847 B72-10613 06
- BLOCKING**  
Implanted telemeter for electrocardiogram and body temperature  
XAC-08505 B72-10035 05
- BLOCKS**  
Dynamic valve to supply constant total thrust to two orifice jets  
ARC-10239 B72-10120 07  
Universal inverted flexure  
ARC-10345 B72-10122 07
- BLOOD CIRCULATION**  
An efficient, simple dialyzer  
HQ-10741 B72-10522 05
- BLOOD PRESSURE**  
Ear oximeter-transducer monitors four physiological responses  
XAC-05422 B72-10224 05  
Blood pressure measurement and display system  
MSC-13036 B72-10334 05  
Electronic circuit detects left ventricular ejection events in cardiovascular system  
LEWIS-11581 B72-10512 05  
A system for automatic analysis of blood pressure data for digital computer entry  
LEWIS-11751 B72-10632 05  
Automated analysis of blood pressure measurements (Korotkov sound)  
MSC-13999 B72-10756 05

**BLOWERS**

- Aircrew oxygen system  
ARC-10247 B72-10195 05
- Nondispersive infrared analyzer for specific gases in complex mixtures  
ARC-10308 B72-10198 03
- Miniature high pressure regulator  
ARC-10428 B72-10211 07

**BLOWING**

- An economical vent cover  
M-FS-20692 B72-10348 07

**BLOWOUTS**

- An economical vent cover  
M-FS-20692 B72-10348 07

**BLUNT BODIES**

- Program to determine radiating, nonadiabatic, inviscid flow over a blunt body by the method of integral relations  
LANGLEY-11048 B72-10067 09

**BODIES OF REVOLUTION**

- Geometrically nonlinear static and dynamic analysis of arbitrarily loaded shells of revolution  
LANGLEY-11109 B72-10504 09

**BODY MEASUREMENT (BIOLOGY)**

- A differential ECG amplifier with single-ended output  
ARC-10411 B72-10061 05

**BODY SIZE (BIOLOGY)**

- Seat belt restraint system  
ARC-10519 B72-10692 06

**BODY TEMPERATURE**

- Implanted telemeter for electrocardiogram and body temperature  
XAC-08505 B72-10035 05
- Time-lapse camera for microscopy  
ARC-10423 B72-10125 05
- An ingestible temperature-transmitter  
ARC-10583 B72-10275 01
- Improved temperature control of liquid cooling garments  
MSC-13917 B72-10281 05

**BOILERS**

- Boiler for generating high quality vapor  
LEWIS-11345 B72-10135 06
- Closed-cycle power supply for fluidic control systems  
ARC-10480 B72-10163 06
- Computer method for identification of boiler transfer functions  
LEWIS-11808 B72-10582 09
- Experimental study of flow distribution with circumferential manifolds  
LEWIS-11649 B72-10738 06

**BOILING**

- Quick, easy to prepare freeze-dried soups  
MSC-14003 B72-10017 05
- Multipurpose top for liquid helium Dewar  
ARC-10533 B72-10302 03
- Temperature control of a cryogenic bath  
HQ-10788 B72-10532 03

**BOLOMETERS**

- Pulse excitation of bolometer bridges  
ARC-10292 B72-10054 01
- Vibrating ribbon bolometer: A concept  
XAC-10768 B72-10170 03

**BOLTS**

- Squib-actuated disconnect device  
NPO-11544 B72-10097 06

**BOLTZMANN TRANSPORT EQUATION**

- Properties of ionization breakdown of air at microwave frequencies and optimization of component dimensions for maximum microwave power  
M-FS-21924 B72-10316 01

**BONDING**

- Specimen for high-temperature tensile tests  
ARC-10531 B72-10028 04
- Aluminum foil interconnects for solar cell panels  
ARC-10374 B72-10058 08
- Optical bonding agents for severe environments  
ARC-10459 B72-10063 04
- Flexible, low-cost silicon solar cell arrays  
LEWIS-11069 B72-10177 02
- High strength, medium density molded foam  
AEC-10053 B72-10235 04
- Failure in glass  
AEC-10088 B72-10364 04
- Bondability of RTV silicon rubber  
AEC-10026 B72-10367 04
- Boron aluminum composite structures  
M-FS-21571 B72-10386 04
- An improved apochromatic wedge utilizing optical molecular contact bonding  
GSFC-11082 B72-10388 03
- Built-in bleeder system in laminated plastic structures  
MSC-17713 B72-10562 08
- An approach to real-time process control of semiconductor wire-bonding  
M-FS-21558 B72-10644 08

**BONES**

- Weight simulator  
ARC-10100 B72-10046 05
- Cutting thin sections of bone  
ARC-10555 B72-10303 05
- Ultrasonic bone densitometer  
M-FS-20994 B72-10450 05

**BOOLEAN FUNCTIONS**

- Techniques for improving reliability of computers  
M-FS-21326 B72-10109 02

**BOOMS (EQUIPMENT)**

- Position indicating, rotating boom  
LANGLEY-11202 B72-10066 07
- Self-deploying boom  
GSFC-10566 B72-10574 07

**BORING MACHINES**

- Universal inverted flexure  
ARC-10345 B72-10122 07

**BORON**

- Structural design and stress analysis program for advanced composite filament-wound axisymmetric pressure vessels (COMTANK)  
NPO-11943 B72-10073 09
- Oxygen-layer structure improves lithium-doped silicon solar cells  
NPO-11403 B72-10085 03
- Introduction of lithium into the front surface of solar cells  
NPO-11404 B72-10086 02
- Nondestructive-test standards for evaluation of fiber-reinforced composites  
M-FS-21288 B72-10157 04
- Improved method for producing metal-reinforced ceramics  
AEC-10070 B72-10234 04

Graphite and boron-reinforced composite materials data summary

- M-FS-21691 B72-10294 04
- Fabrication of uniaxial filament-reinforced epoxy tubes for structural application  
LANGLEY-10203 B72-10340 04
- Boron aluminum composite structures  
M-FS-21571 B72-10386 04

**BORON COMPOUNDS**

- Titanium reinforced boron polyimide composite  
M-FS-21916 B72-10353 04
- Equations to assess the impact resistance of fiber composites  
LEWIS-11486 B72-10503 04

**BORON 10**

- Boron-10 loaded inorganic shielding material  
M-FS-22280 B72-10740 04

**BOUNDARIES**

- Program for the transient response of ablating axisymmetric bodies including the effects of shape change  
LANGLEY-11049 B72-10068 09

**BOUNDARY LAYER CONTROL**

- Integrated flight controller for light aircraft  
ARC-10456 B72-10213 06
- Pressure-probe assembly for wind tunnels  
ARC-10569 B72-10248 03

**BOUNDARY LAYERS**

- Design of two-dimensional sharp-edged-throat supersonic nozzle with boundary-layer correction  
LEWIS-11636 B72-10070 09

**BOUNDARY LUBRICATION**

- Lubricant selection for gear designers  
LEWIS-11483 B72-10136 04

**BRACKETS**

- Electrical grounding bracket  
ARC-10041 B72-10045 01

**BRAIN**

- A thermocouple thermode for small animals  
ARC-10550 B72-10559 05

**BRAKES (FOR ARRESTING MOTION)**

- Sprag solenoid brake  
M-FS-21846 B72-10669 06

**BRAKING**

- Optimized braking of landing vehicles with atmospheric drag  
NPO-11402 B72-10084 06

**BRASSES**

- Soldering iron temperature indicator  
NPO-11545 B72-10098 02

**BRAZING**

- High-temperature ceramic-to-ceramic seals  
ARC-10319 B72-10199 04
- Nondestructive testing for braze voids in thin panels by use of special coatings  
LANGLEY-10486 B72-10374 08
- The weld-brazing metal joining process  
LANGLEY-11072 B72-10683 08

**BREAKDOWN**

- Novel dielectric reduces corona breakdown in ac capacitors  
M-FS-21486 B72-10505 01

**BREATHING**

- Balanced-bellows spirometer  
XAC-01547 B72-10279 05
- Electronic circuit detects left ventricular ejection events in cardiovascular system  
LEWIS-11581 B72-10512 05

- Breathing-metabolic simulator  
 HQ-10766 B72-10657 05  
 Metabolic simulation chamber  
 HQ-10776 B72-10658 05  
 Simulated breath waveform control  
 HQ-10779 B72-10661 05

**BREATHING APPARATUS**

- Regenerable metallic oxide systems for removal of carbon dioxide: A concept  
 ARC-10570 B72-10420 04  
 Patient's breath controls comfort devices  
 LANGLEY-11138 B72-10533 05  
 Breathing-metabolic simulator  
 HQ-10766 B72-10657 05  
 Drive mechanism for production of simulated human breath  
 HQ-10777 B72-10659 05  
 An efficient prebreathing apparatus for humans during decompression  
 MSC-14151 B72-10690 05

**BRICKS**

- Flexible shielding system for radiation protection  
 LRL-10028 B72-10500 03

**BRITTLE MATERIALS**

- Simple, reproducible methods for thermal shock testing of brittle materials  
 NUC-11020 B72-10228 06  
 Repeatable method of thermal stress fracture test of brittle materials  
 NUC-11019 B72-10258 06  
 Energy absorbing system for mechanical impacts  
 NPO-10671 B72-10712 06

**BRITTLINESS**

- Failure in glass  
 AEC-10088 B72-10364 04

**BROADBAND**

- ARC protection system for high-power RF amplifiers  
 NPO-11560 B72-10099 02  
 Projections of scan patterns on human retina  
 ARC-10181 B72-10193 05  
 Improved intensifying screen reduces X-ray exposure  
 AEC-10090 B72-10232 03  
 Wideband wattmeter for instant measurement of real power  
 LEWIS-11698 B72-10737 01

**BROADBAND AMPLIFIERS**

- Lightweight, broad-band spectrum analyzer  
 ARC-10405 B72-10060 01  
 Low phase-shift amplifier  
 NPO-11663 B72-10185 01  
 Broadband RF-distribution amplifier  
 NPO-11401 B72-10245 01

**BROMINE**

- Halogenation of microcapsule walls  
 ARC-10410 B72-10161 04

**BROMINE COMPOUNDS**

- Initiation of polymerization by tetrabutylammonium p-lithiophenoxide  
 ARC-10553 B72-10223 04

**BROTHS**

- Quick, easy to prepare freeze-dried soups  
 MSC-14003 B72-10017 05

**BUBBLES**

- Expandable coating cocoon leak detection system  
 M-FS-21848 B72-10380 06  
 Two-axis leveling detector system  
 M-FS-21344 B72-10392 02

- Phase-change materials handbook  
 M-FS-22064 B72-10464 04

**BUCKLING**

- Simple method for forming thin-wall pressure vessels  
 ARC-10511 B72-10025 08  
 Isogrid structure  
 M-FS-21567 B72-10323 06  
 Geometrically nonlinear static and dynamic analysis of arbitrarily loaded shells of revolution  
 LANGLEY-11109 B72-10504 09

**BUFFERS (CHEMISTRY)**

- Glass technology involved in the manufacture of magnetometer components  
 GSFC-11283 B72-10132 03

**BUFFETING**

- Wind tunnel buffet load measuring technique  
 ARC-10495 B72-10022 06

**BUILDINGS**

- Flexible shielding system for radiation protection  
 LRL-10028 B72-10500 03

**BULBS**

- Soldering iron temperature indicator  
 NPO-11545 B72-10098 02  
 Glass technology involved in the manufacture of magnetometer components  
 GSFC-11283 B72-10132 03

**BURNING RATE**

- Suppressants for lowering propellant binder burning rate  
 ARC-10563 B72-10560 04

**BUS CONDUCTORS**

- Peak-power-point monitor for solar panel  
 NPO-11708 B72-10694 02

**BUSHINGS**

- Low cost anti-galling bushings  
 LEWIS-11724 B72-10359 08

**BUTADIENE**

- Improved elastomer for use with oxygen difluoride  
 ARC-10528 B72-10027 04

**BUTT JOINTS**

- Simple method for forming thin-wall pressure vessels  
 ARC-10511 B72-10025 08  
 Bonding titanium to Rene 41 alloy  
 ARC-10311 B72-10041 08

**BYPASSES**

- A hybrid electromechanical solid state switch for ac power control  
 MSC-14005 B72-10018 02  
 High voltage protection network  
 ARC-10197 B72-10119 02  
 Frequency switch keyed oscillator  
 ARC-10412 B72-10124 01

**C****CABIN ATMOSPHERES**

- Oxygen reclamation with solid oxide electrolytes  
 ARC-10487 B72-10273 03  
 Leak test system  
 M-FS-21788 B72-10576 06  
 Automation of Bosch reaction for CO<sub>2</sub> reduction  
 M-FS-21674 B72-10666 04

**CABLES**

- Slitting flat conductor cables with the single cutting edge slitter  
 M-FS-20111 B72-10575 07

**CABLES (ROPES)**

- A cable stabilizer for outdoor elevators  
 KSC-10513 B72-10283 07  
 A tool for measuring elevator cable tension  
 KSC-10708 B72-10509 07

**CADMIUM COMPOUNDS**

- Electrodes for sealed secondary batteries  
 ARC-10238 B72-10050 02

**CADMIUM SULFIDES**

- High field CdS detector for infrared radiation  
 LANGLEY-11027 B72-10725 04

**CALCIFICATION**

- Ultrasonic bone densitometer  
 M-FS-20994 B72-10450 05

**CALCITE**

- Optical bonding agents for severe environments  
 ARC-10459 B72-10063 04

**CALCIUM**

- Weight simulator  
 ARC-10100 B72-10046 05

**CALCIUM COMPOUNDS**

- Acousto-optic filter for electronic laser tuning  
 HQ-10715 B72-10520 03

**CALCIUM FLUORIDES**

- Stable photosensor amplifiers  
 NPO-11561 B72-10100 01  
 Interferometric rotation sensor  
 ARC-10278 B72-10274 03

**CALCIUM OXIDES**

- Oxygen reclamation with solid oxide electrolytes  
 ARC-10487 B72-10273 03

**CALCIUM TUNGSTATES**

- Improved intensifying screen reduces X-ray exposure  
 AEC-10090 B72-10232 03

**CALCULATORS**

- Frequency-wavelength calculator with table of dielectric properties  
 GSFC-11200 B72-10472 03

**CALIBRATING**

- Remote sensing X-ray spectrometer  
 MSC-13978 B72-10016 03  
 An improved aesthesiometer  
 MSC-13609 B72-10032 05  
 Low temperature scale for a 1 to 20 degree Kelvin region  
 AEC-10007 B72-10146 03  
 Laboratory leak tester provides high sensitivity  
 AEC-10042 B72-10240 03  
 Small turbine-type flowmeters for liquid hydrogen  
 LEWIS-11535 B72-10331 06  
 Computer program for fitting low-order polynomial splines by method of least squares  
 LEWIS-11651 B72-10585 09

- Oscillating hot-wire anemometer  
 NPO-11634 B72-10609 02  
 Use of small turbine-type flowmeters to measure flow in large pipes  
 LEWIS-11851 B72-10631 06  
 Linear accelerator: A concept  
 KSC-10618 B72-10636 06

- Portable beveling tool  
 M-FS-16863 B72-10678 07

**CALIFORNIA**

- Wind trajectory tracing for air pollution studies (AIRPOL)  
 NPO-11892 B72-10072 09

## SUBJECT INDEX

### CALORIMETERS

- Method of determining thermal conductivity in multi-layer insulation systems  
M-FS-20213 872-10154 03
- Superior cryogenic insulation developed  
M-FS-21560 872-10187 04

### CAMERA SHUTTERS

- Nematic liquid crystals for optical shutters: A concept  
NPO-11367 872-10083 03
- Cine recording ophthalmoscope  
ARC-10399 872-10189 05
- Hand-held photomicroscopy system  
ARC-10468 872-10190 03

### CAMERAS

- Time-lapse camera for microscopy  
ARC-10423 872-10125 05
- Projections of scan patterns on human retina  
ARC-10181 872-10193 05
- Optical device for producing color line scan display from monochrome oscilloscope traces  
LANGLEY-10896 872-10375 03
- Neutron radiographic viewing system  
M-FS-22024 872-10468 02

### CANS

- Regenerable metallic oxide systems for removal of carbon dioxide: A concept  
ARC-10570 872-10420 04
- Flexible shielding system for radiation protection  
LRL-10028 872-10500 03

### CAPACITANCE

- Voltage-tunable parallel-T filter for remote operation  
NPO-11165 872-10077 01
- Simple dynamic electromagnetic radiation detector  
LEWIS-11159 872-10227 03

### CAPACITORS

- High noise immunity one shot  
ARC-10137 872-10047 01
- Improved device measures performance of batteries under load  
ARC-10252 872-10051 02
- Voltage-tunable parallel-T filter for remote operation  
NPO-11165 872-10077 01
- Control of acceleration in sine/random vibration tests  
NPO-11482 872-10091 02
- Tornado detector and alarm  
M-FS-20915 872-10106 01
- Frequency switch keyed oscillator  
ARC-10412 872-10124 01
- Heart simulator  
M-FS-21609 872-10131 02
- Vibrating ribbon bolometer: A concept  
XAC-10768 872-10170 03
- Improved high-performance shock tube  
NPO-11885 872-10242 03
- Control of oscillations in a discharge circuit  
ARC-10556 872-10304 01
- A simple tachometer circuit  
ARC-10603 872-10308 01
- Aluminum nitride insulating films for MOSFET devices  
NPO-11859 872-10425 04
- Novel dielectric reduces corona breakdown in ac capacitors  
M-FS-21486 872-10505 01

Electronic integrator for gyro rate output voltages  
NPO-11499 872-10555 01

### CAPILLARY FLOW

- Closed-cycle power supply for fluidic control systems  
ARC-10480 872-10163 06
- Internal capillary insulation for cryogenic tanks  
LEWIS-11234 872-10626 06

### CAPILLARY TUBES

- Restartable heat pipe  
ARC-10198 872-10188 03
- Microminiature gas chromatographic column  
ARC-10594 872-10306 04
- Stabilization of porous glass reverse-osmosis membranes  
ARC-10646 872-10309 04

### CAPSULES

- Ferrofluidic solenoid with axial and radial displacement  
NPO-11738 872-10241 06

### CARBIDES

- Improved method for producing metal-reinforced ceramics  
AEC-10070 872-10234 04

### CARBOHYDRATES

- Immobilized phosphorylase for synthesis of polysaccharides from glucose  
ARC-10680 872-10550 04

### CARBON

- Isotropic pyrolytic carbons  
ARC-10532 872-10029 04
- High speed, self-acting, face-contact shaft seal has low leakage and very low wear  
LEWIS-11598 872-10114 07
- Trace contaminant adsorption and sorbent regeneration in closed ecological systems  
LANGLEY-10681 872-10328 04
- Nonmetallic impurities improve mechanical properties of vapor-deposited tungsten  
LEWIS-10800 872-10454 04
- Al/Cl<sub>2</sub> molten salt battery  
HQ-10696 872-10527 01
- Polishing is made cheaper by disposable diamond-impregnated abrasive cloth  
MSC-14247 872-10616 08

### CARBON DIOXIDE

- Space-suit carbon dioxide absorption system: A concept  
ARC-10546 872-10168 05
- Aircrew oxygen system  
ARC-10247 872-10195 05
- Simple gas chromatographic system for analysis of microbial respiratory gases  
ARC-10403 872-10207 03
- Oxygen reclamation with solid oxide electrolytes  
ARC-10487 872-10273 03
- Study of in-situ degradation of thermal control surfaces  
M-FS-20892 872-10336 04
- Helium leak measurements using CO<sub>2</sub> as a carrier  
M-FS-21742 872-10354 03
- A continuous physiological data collector  
M-FS-20835 872-10402 05
- Solid amine compounds as sorbents for carbon dioxide: A concept  
ARC-10571 872-10421 04

## CARDIOVASCULAR SYSTEM

Dry ice plug for hydraulic and pneumatic pipe flushing

- MSC-12548 872-10496 06
- Carbon dioxide concentration indicator  
HQ-10582 872-10526 05
- Breathing-metabolic simulator  
HQ-10766 872-10657 05
- Metabolic simulation chamber  
HQ-10776 872-10658 05
- Automation of Bosch reaction for CO<sub>2</sub> reduction  
M-FS-21674 872-10666 04

### CARBON DIOXIDE CONCENTRATION

- Carbon dioxide concentrator  
ARC-10245 872-10194 05
- Aircrew oxygen system  
ARC-10247 872-10195 05
- Carbon dioxide concentration indicator  
HQ-10582 872-10526 05

### CARBON DIOXIDE LASERS

- Efficient wire-grid duplexer-polarized for CO<sub>2</sub> lasers  
GSFC-11403 872-10440 03
- Floating zone process for drawing small diameter fibers of refractory materials  
LEWIS-11380 872-10491 04
- Measurement of electron density and temperature in plasmas  
ARC-10598 872-10563 03

### CARBON DIOXIDE REMOVAL

- Carbon dioxide concentrator  
ARC-10245 872-10194 05
- Regenerable metallic oxide systems for removal of carbon dioxide: A concept  
ARC-10570 872-10420 04

### CARBON FIBERS

- Specimen for high-temperature tensile tests  
ARC-10531 872-10028 04
- Fabrication of carbon film composites for high-strength structures  
ARC-10613 872-10423 04

### CARBON MONOXIDE

- Carbon monoxide oxidation rates computed for automobile thermal reactor conditions  
LEWIS-11638 872-10137 04
- Comparison of catalyst activity  
ARC-10493 872-10201 04
- Diatomic infrared gasdynamic laser permits selection of wavelengths  
ARC-10370 872-10206 03
- Oxygen reclamation with solid oxide electrolytes  
ARC-10487 872-10273 03
- Air assist fuel nozzle reduces aircraft gas turbine engine emissions at idle operation  
LEWIS-11512 872-10434 07

### CARBON STEELS

- Study of hot hardness characteristics of tool steels  
LEWIS-11785 872-10583 04

### CARBON 14

- Gas leak-detection system  
NPO-11405 872-10087 03

### CARBONIC ACID

- Carbon dioxide concentration indicator  
HQ-10582 872-10526 05

### CARBOXYLIC ACIDS

- A method of isolating organic compounds present in water  
AEC-10010 872-10044 04

### CARDIOVASCULAR SYSTEM

- Electronic circuit detects left ventricular ejection events in cardiovascular system  
LEWIS-11581 872-10512 05

## CARRIER FREQUENCIES

Accurate measurement of telemetry performance  
NPO-11457 B72-10089 02

## CARRIERS

Quick-donning backpack harness  
LANGLEY-10102 B72-10641 05

## CASCADE CONTROL

Pulsed high-power arc heater with improved cathode and triggering mechanism  
ARC-10173 B72-10048 03

## CASCADE FLOW

Slot configuration for axial-flow turbo-machinery blades  
LEWIS-11572 B72-10484 07

## CASSEGRAIN ANTENNAS

Compensating subreflector for two-reflector antennas: A concept  
NPO-11503 B72-10093 06

## CASTING

Composite casting demonstration  
M-FS-21668 B72-10266 04

## CATALYSTS

Comparison of catalyst activity  
ARC-10493 B72-10201 04

Hydrogen eliminator  
ARC-10408 B72-10208 03

Silver-chlorine fuel cell: A concept  
ARC-10491 B72-10221 03

Initiation of polymerization by tetrabutylammonium p-lithiophenoxide  
ARC-10553 B72-10223 04

Fire retardant polyisocyanurate foam  
ARC-10280 B72-10269 04

Catalyst for sodium chlorate decomposition  
ARC-10584 B72-10305 04

Free-radical solution-polymerization of trifluoronitrosomethane with tetrafluoroethylene  
ARC-10567 B72-10419 04

Chemical modification of poly(p-phenylene) for use in ablative compositions  
ARC-10135 B72-10451 04

Catalytic activity

Propellant-powered actuator for gas generators  
ARC-10484 B72-10008 03

Low temperature catalytic ignition of hydrogen and oxygen  
ARC-10492 B72-10127 03

Comparison of catalyst activity  
ARC-10493 B72-10201 04

CATHETERIZATION

Heart catheter cable and connector  
ARC-10406 B72-10200 05

## CATHODE RAY TUBES

Aircraft communication via telefacsimile system  
M-FS-20839 B72-10139 02

Projections of scan patterns on human retina  
ARC-10181 B72-10193 05

Optical device for producing color line scan display from monochrome oscilloscope traces  
LANGLEY-10896 B72-10375 03

A visual-display and storage device  
GSFC-10901 B72-10647 02

Propellant feed systems transients  
MSC-17848 B72-10677 06

## CATHODES

Pulsed high-power arc heater with improved cathode and triggering mechanism  
ARC-10173 B72-10048 03

Electrodes for sealed secondary batteries  
ARC-10238 B72-10050 02

High-temperature, long-life thyratron  
LEWIS-11327 B72-10134 01

Silver-chlorine fuel cell: A concept  
ARC-10491 B72-10221 03

Improved high-performance shock tube  
NPO-11885 B72-10242 03

Ion plating seals microcracks or porous metal components  
LEWIS-11657 B72-10397 04

Al/C12 molten salt battery  
HQ-10696 B72-10527 01

High-intensity source of extreme ultraviolet  
HQ-10754 B72-10528 03

Cathode for use with low density gases  
HQ-10687 B72-10530 01

Prevention of cathode damage from positive ion bombardment  
HQ-10688 B72-10654 03

CAVITATION FLOW

Cavitating Venturi sump  
ARC-10504 B72-10012 06

Cavitation data for hydraulic equipment  
LEWIS-11642 B72-10384 07

Computer programs for the design of liquid-to-liquid jet pumps  
LEWIS-11679 B72-10584 09

CAVITIES

Universal inverted flexure  
ARC-10345 B72-10122 07

Survey of information concerning large diameter deep hole drilling  
AEC-10051 B72-10238 08

Water cavity degasser for electrolysis cells  
ARC-10244 B72-10246 03

A sensitive image intensifier which uses inert gas  
LRL-10024 B72-10312 03

Prevention of cathode damage from positive ion bombardment  
HQ-10688 B72-10654 03

A bi-stable optical device  
HQ-10701 B72-10655 03

CAVITY RESONATORS

Acousto-optic filter for electronic laser tuning  
HQ-10715 B72-10520 03

Mechanically and thermally stable, maser cavity resonator  
HQ-10790 B72-10523 01

CDC COMPUTERS

FORTTRAN read package  
MSC-14161 B72-10750 09

CDC 3200 COMPUTER

Two autowire versions for CDC-3200 and IBM-360  
GSFC-11526 B72-10608 09

CDC 6000 SERIES COMPUTERS

Program for the transient response of ablating axisymmetric bodies including the effects of shape change  
LANGLEY-11049 B72-10068 09

Mislift and miss-drag programs  
LANGLEY-10932 B72-10153 09

## CDC 6400 COMPUTER

Variable boundary II heat conduction  
LEWIS-10679 B72-10444 09

## CDC 6600 COMPUTER

Program to determine radiating, nonadiabatic, inviscid flow over a blunt body by the method of integral relations  
LANGLEY-11048 B72-10067 09

Rapid analysis of electric propulsion missions  
ARC-10430 B72-10299 09

Propulsion sizing program  
MSC-14016 B72-10605 09

Effects of nonuniform swash-plate stiffness on coupled blade-control system dynamics and stability  
LANGLEY-11068 B72-10749 06

CELESTIAL MECHANICS

Gravitational gradiometer measures mass changes  
M-FS-20814 B72-10140 03

CELL CATHODES

Cell for electrolysis of water vapor  
ARC-10521 B72-10166 03

CELLS (BIOLOGY)

Time-lapse camera for microscopy  
ARC-10423 B72-10125 05

A reusable prepositioned ATP reaction chamber  
HQ-10660 B72-10525 05

Automatic agar tray inoculation device  
LANGLEY-11074 B72-10637 05

A process yields large quantities of pure ribosome subunits  
HQ-10662 B72-10653 05

CELLULOSE

Water purification by reverse osmosis using heterocyclic polymer membranes  
LANGLEY-10514 B72-10230 04

Insolubilized enzymes for food synthesis  
ARC-10568 B72-10247 04

An efficient, simple dialyzer  
HQ-10741 B72-10522 05

CEMENTATION

A protective coating for stainless steel  
LEWIS-11267 B72-10256 04

CEMENTS

Optical bonding agents for severe environments  
ARC-10459 B72-10063 04

CENTAUR LAUNCH VEHICLE

Main tank injection pressurization program  
LEWIS-11368 B72-10069 09

CENTRAL NERVOUS SYSTEM

A thermocouple thermode for small animals  
ARC-10550 B72-10559 05

CENTRIFUGAL COMPRESSORS

Continuous-flow variable-density wind tunnel facilities  
NPO-11287 B72-10078 06

CENTRIFUGAL FORCE

Cine recording ophthalmoscope  
ARC-10399 B72-10189 05

CENTRIFUGAL PUMPS

A method for calculating the effects of design errors and measurement errors on pump performance  
LEWIS-11503 B72-10292 07

CENTRIFUGES

Improved method for reclaiming vacuum diffusion pump oil  
LEWIS-11647 B72-10511 04

**CENTRIFUGING**

Separation of gas mixtures by centrifugation  
ARC-10449 B72-10270 03

**CERAMIC BONDING**

A piezoelectrically actuated ball valve  
ARC-10338 B72-10204 06

**CERAMICS**

High-temperature ceramic-to-ceramic seals  
ARC-10319 B72-10199 04  
Fabrication of large ceramic electrolyte disks  
ARC-10320 B72-10202 03  
A piezoelectrically actuated ball valve  
ARC-10338 B72-10204 06  
Improved method for producing metal-reinforced ceramics  
AEC-10070 B72-10234 04  
Inorganic glass ceramic slip rings  
M-FS-20711 B72-10313 04  
Plasma calcining of pigment particles for thermal control coatings  
M-FS-21267 B72-10320 04  
Ultrasonic bone densitometer  
M-FS-20994 B72-10450 05  
Radiation-induced nickel deposits  
LEWIS-10965 B72-10456 04  
Floating zone process for drawing small diameter fibers of refractory materials  
LEWIS-11380 B72-10491 04  
Mechanically and thermally stable maser cavity resonator  
HQ-10790 B72-10523 01  
High strength high modulus ceramic fiber  
M-FS-21266 B72-10592 04

**CESIUM**

Glass technology involved in the manufacture of magnetometer components  
GSFC-11283 B72-10132 03

**CESIUM ION**

Device for measuring electric fields  
ARC-10164 B72-10148 03

**CESIUM OXIDES**

Advanced infrared photomultiplier  
M-FS-20941 B72-10152 03

**CESIUM 137**

Fast response densitometer for measuring liquid density  
M-FS-14478 B72-10664 02

**CHANNEL FLOW**

FORTAN program for generating a two-dimensional orthogonal mesh between two arbitrary boundaries  
LEWIS-11863 B72-10753 09

**CHARGED PARTICLES**

Mass separator for low velocity ions  
ARC-10375 B72-10123 03

**CHECKOUT**

Software control for large scale on-board checkout: A concept  
MSC-13977 B72-10015 09  
Systems effectiveness evaluation program  
HQ-10306 B72-10458 09

**CHEMICAL ANALYSIS**

Direct analysis of hydrogen/deuterium mixtures: A concept  
NPO-11322 B72-10244 03  
Oxygen carrier for gas chromatographic analysis of inert gases in propellants  
ARC-10574 B72-10249 04  
Phosphorus in land-water systems  
AEC-10049 B72-10429 05  
An improved gas extraction furnace  
MSC-14138 B72-10544 04

Immobilized phosphorylase for synthesis of polysaccharides from glucose  
ARC-10680 B72-10550 04  
Laser mass spectrometer  
ARC-10687 B72-10571 03

**CHEMICAL ATTACK**

Improved zinc oxide thermal control coatings  
NPO-11139 B72-10711 04

**CHEMICAL BONDS**

An improved apochromatic wedge utilizing optical molecular contact bonding  
GSFC-11082 B72-10388 03

**CHEMICAL COMPOSITION**

Titanium alloy stress corrosion cracking in presence of dinitrogen tetroxide  
M-FS-21113 B72-10321 04  
Synthesis of temperature and solvent-resistant polymers  
M-FS-20848 B72-10342 04  
Thermally resistant polymers for fuel tank sealants  
M-FS-21232 B72-10358 04  
Polymeric binder for explosives  
AEC-10062 B72-10366 04  
Bondability of RTV silicon rubber  
AEC-10026 B72-10367 04  
Technique for increasing yield of trifluoronitrosomethane-tetrafluoroethylene lymer  
ARC-10566 B72-10418 04

Process for synthesizing and formulating condensed ring polymers  
LANGLEY-10423 B72-10473 04  
Preparation of stable colloidal dispersions in fluorinated liquids  
HQ-10580 B72-10529 04  
Laser mass spectrometer  
ARC-10687 B72-10571 03  
Polyimide bonded graphite fluoride: A new long life solid lubricant coating  
LEWIS-11864 B72-10628 04  
A process yields large quantities of pure ribosome subunits  
HQ-10662 B72-10653 05  
Breathing-metabolic simulator  
HQ-10766 B72-10657 05  
Metabolic simulation chamber  
HQ-10776 B72-10658 05  
Computer program for calculation of complex chemical equilibrium compositions  
LEWIS-11714 B72-10718 09

**CHEMICAL COMPOUNDS**

Solid amine compounds as sorbents for carbon dioxide: A concept  
ARC-10571 B72-10421 04  
Three bit mass spectral search program  
NPO-11960 B72-10747 09

**CHEMICAL ELEMENTS**

An empirical relationship for the penetration of 1 to 3 MeV electrons  
LEWIS-11495 B72-10144 04  
Aerotherm chemical equilibrium (ACE) computer program  
LEWIS-11722 B72-10739 09

**CHEMICAL ENGINEERING**

Space-suit carbon dioxide absorption system: A concept  
ARC-10546 B72-10168 05

**CHEMICAL EQUILIBRIUM**

Program to determine radiating, nonadiabatic, inviscid flow over a blunt body by the method of integral relations  
LANGLEY-11048 B72-10067 09

Computer program for calculation of complex chemical equilibrium compositions  
LEWIS-11714 B72-10718 09

**CHEMICAL PROPERTIES**

Mercury in the environment  
AEC-10048 B72-10233 05  
Devolatilization of polymer resins  
GSFC-11358 B72-10280 04  
Floating zone process for drawing small diameter fibers of refractory materials  
LEWIS-11380 B72-10491 04  
Immobilized phosphorylase for synthesis of polysaccharides from glucose  
ARC-10680 B72-10550 04

**CHEMICAL REACTIONS**

Flame resistant elastic elastomeric fibers  
MSC-13923-4 B72-10005 04  
New polyimide polymer has excellent processing characteristics with improved thermo-oxidative and hydrolytic stabilities  
LEWIS-11323 B72-10175 04  
Insolubilized enzymes for food synthesis  
ARC-10568 B72-10247 04  
Devolatilization of polymer resins  
GSFC-11358 B72-10280 04  
Polyimide foams provide thermal insulation and fire protection  
ARC-10464 B72-10300 04  
Catalyst for sodium chlorate decomposition  
ARC-10584 B72-10305 04  
Synthesis of temperature and solvent-resistant polymers  
M-FS-20848 B72-10342 04  
Polymeric binder for explosives  
AEC-10062 B72-10366 04  
Technique for increasing yield of trifluoronitrosomethane-tetrafluoroethylene lymer  
ARC-10566 B72-10418 04

Regenerable metallic oxide systems for removal of carbon dioxide: A concept  
ARC-10570 B72-10420 04  
Solid amine compounds as sorbents for carbon dioxide: A concept  
ARC-10571 B72-10421 04  
Phosphonium chloride for thermal storage  
ARC-10572 B72-10422 04  
Improved magnesia for thermal control coatings  
ARC-10677 B72-10424 04  
Strengthening lightweight concrete  
AEC-10017 B72-10430 04  
Electron beam chemistry produces high purity metals  
LEWIS-11639 B72-10439 04  
Chemical modification of poly(p-phenylene) for use in ablative compositions  
ARC-10135 B72-10451 04  
Process for synthesizing and formulating condensed ring polymers  
LANGLEY-10423 B72-10473 04  
Functionally terminated liquid nitroso fluorocarbon terpolymers  
M-FS-21539 B72-10493 04  
A reusable prepositioned ATP reaction chamber  
HQ-10660 B72-10525 05  
New type of trifunctional alcohol  
NPO-10714 B72-10553 04

- Oxygen plasmas used to synthesize superoxides  
 ARC-10686 B72-10570 04  
 Chemical kinetics computer program for static and flow reactions  
 LEWIS-11467 B72-10580 04  
 High strength high modulus ceramic fiber  
 M-FS-21266 B72-10592 04  
 A process yields large quantities of pure ribosome subunits  
 HQ-10662 B72-10653 05  
 Automation of Bosch reaction for CO<sub>2</sub> reduction  
 M-FS-21674 B72-10666 04  
 Ultraviolet and thermally stable polymer compositions  
 ARC-10592 B72-10709 04  
 Low-void polyimide resins for autoclave processing  
 LEWIS-11665 B72-10728 04
- CHEMISORPTION**  
 Adhesion theory review  
 AEC-10083 B72-10231 04
- CHEMISTRY**  
 Three bit mass spectral search program  
 NPO-11960 B72-10747 09
- CHEMOTHERAPY**  
 Implantable drug therapy device: A concept  
 NPO-11934 B72-10708 05
- CHIPS**  
 Flexible desk top computers using Large Scale Integration (L.S.I.) chips  
 M-FS-21277 B72-10112 01  
 Microminiature gas chromatographic column  
 ARC-10594 B72-10306 04  
 Redundancy approaches in bubble domain memories  
 M-FS-21915 B72-10643 01
- CHLORINE**  
 Silver-chlorine fuel cell: A concept  
 ARC-10491 B72-10221 03  
 Titanium alloy stress corrosion cracking in presence of dinitrogen tetroxide  
 M-FS-21113 B72-10321 04  
 Al/Cl<sub>2</sub> molten salt battery  
 HQ-10696 B72-10527 01
- CHLOROPHYLLS**  
 Assessment of water pollution by airborne measurement of chlorophyll  
 ARC-10648 B72-10566 04
- CHOKES (RESTRICTIONS)**  
 Circuit controls turn-on current  
 NPO-11339 B72-10079 01
- CHROMATES**  
 Glass technology involved in the manufacture of magnetometer components  
 GSFC-11283 B72-10132 03
- CHROMATOGRAPHY**  
 Simple gas chromatographic system for analysis of microbial respiratory gases  
 ARC-10403 B72-10207 03  
 Direct analysis of hydrogen/deuterium mixtures: A concept  
 NPO-11322 B72-10244 03
- CHROMIUM**  
 Efficient wire-grid duplexer-polarized for CO<sub>2</sub> lasers  
 GSFC-11403 B72-10440 03
- CHROMIUM ALLOYS**  
 Advanced protective coating for superalloys  
 LEWIS-11473 B72-10150 04
- A protective coating for stainless steel  
 LEWIS-11267 B72-10256 04  
 Dispersion-strengthened chromium alloy  
 LEWIS-10982 B72-10378 04
- CHROMIUM OXIDES**  
 Floating zone process for drawing small diameter fibers of refractory materials  
 LEWIS-11380 B72-10491 04
- CHROMIUM STEELS**  
 Common bearing material has highest fatigue life at moderate temperature  
 LEWIS-11592 B72-10382 04
- CHRONOPHOTOGRAPHY**  
 Time-lapse camera for microscopy  
 ARC-10423 B72-10125 05
- CIRCADIAN RHYTHMS**  
 An ingestible temperature-transmitter  
 ARC-10583 B72-10275 01
- CIRCUIT BOARDS**  
 Magnetic circuitry mutual coupling probe  
 M-FS-21664 B72-10535 02  
 A simple, efficient resistance soldering apparatus  
 GSFC-10913 B72-10649 08
- CIRCUIT BREAKERS**  
 A hybrid electromechanical solid state switch for ac power control  
 MSC-14005 B72-10018 02  
 Current switch has built-in time delay: A concept  
 MSC-17324 B72-10453 01
- CIRCUIT DIAGRAMS**  
 Circuit permits independent adjustment of gain and offset at constant input impedance  
 ARC-10348 B72-10057 01  
 A reliable liquid helium detector  
 LEWIS-11487 B72-10145 01  
 Low phase-shift amplifier  
 NPO-11663 B72-10185 01  
 Interferometric measurement of the velocity of radiating particles  
 HQ-10371 B72-10495 03  
 Pulse-width-modulated device for precision temperature control  
 NPO-11407 B72-10507 02  
 A compact battery powered digital thermometer  
 MSC-14084 B72-10545 02  
 Photomultiplier blanking circuit  
 ARC-10593 B72-10561 01  
 A simplified, compact static shift register  
 HQ-10723 B72-10591 02  
 Dc motor proportional control system for orthotic devices  
 M-FS-21573 B72-10617 05  
 A range expanding signal conditioner  
 M-FS-21720 B72-10639 02  
 Speech therapy and voice recognition instrument  
 HQ-10628 B72-10652 05  
 Low distortion automatic phase control circuit  
 M-FS-21671 B72-10682 02  
 New detection method for rolling element and bearing defects  
 M-FS-21911 B72-10689 06  
 Waveguide switch protector  
 NPO-11592 B72-10705 01  
 Automatic method of measuring silicon-controlled-rectifier holding current  
 LEWIS-11898 B72-10752 02
- CIRCUIT PROTECTION**  
 Arc protection system for high-power RF amplifiers  
 NPO-1156C B72-10099 02  
 New meter probes provide protection from high current power sources at potentials up to 600 volts  
 LANGLEY-10804 B72-10455 01  
 Photomultiplier blanking circuit  
 ARC-10593 B72-10561 01
- CIRCUIT RELIABILITY**  
 Magnetic circuitry mutual coupling probe  
 M-FS-21664 B72-10535 02
- CIRCUITS**  
 A hybrid electromechanical solid state switch for ac power control  
 MSC-14005 B72-10018 02  
 Solar experiment alignment system  
 ARC-10471 B72-10020 03  
 Implanted telemeter for electrocardiogram and body temperature  
 XAC-08505 B72-10035 05  
 Pseudo-saturating power converter  
 NPO-11368 B72-10042 01  
 A differential ECG amplifier with single-ended output  
 ARC-10411 B72-10061 05  
 Oxygen pressure control for electrolysis cells  
 ARC-10250 B72-10074 02  
 Precision voltage regulator  
 NPO-11502 B72-10092 01  
 Piezoelectric actuator uses sequentially-excited multiple elements: A concept  
 NPO-11527 B72-10096 01  
 Soldering iron temperature indicator  
 NPO-11545 B72-10098 02  
 Tornado detector and alarm  
 M-FS-20915 B72-10106 01  
 Frequency switch keyed oscillator  
 ARC-10412 B72-10124 01  
 High solar intensity radiometer  
 LEWIS-11533 B72-10130 03  
 Heart simulator  
 M-FS-21609 B72-10131 02  
 Standardization and qualification of computer programs for circuit design  
 M-FS-21537 B72-10142 09  
 Crystal-controlled multivibrator  
 NPO-11627 B72-10155 01  
 Differential input preamplifier  
 ARC-10489 B72-10165 01  
 Temperature compensation of light-emitting diodes  
 ARC-10467 B72-10218 01  
 Driver circuit for inductive loads  
 ARC-10073 B72-10268 01  
 Lightning flash detection system  
 ARC-10562 B72-10272 02  
 Vidicon storage tube electrical input/output  
 MSC-14053 B72-10285 02  
 Control of oscillations in a discharge circuit  
 ARC-10556 B72-10304 01  
 Guidelines for fabrication of hybrid microcircuits  
 M-FS-21964 B72-10393 01  
 Ultrasonic bone densitometer  
 M-FS-20994 B72-10450 05  
 Amplifier for signal from thin film transducer  
 LEWIS-11494 B72-10463 01  
 Specification guidelines for hybrid microcircuits  
 M-FS-22090 B72-10474 01

- A magnetic mouse activity meter  
HQ-10664 872-10482 05
- Electronic circuit detects left ventricular  
ejection events in cardiovascular system  
LEWIS-11581 872-10512 05
- Electronic integrator for gyro rate output  
voltages  
NPO-11499 872-10555 01
- Redundancy approaches in bubble  
domain memories  
M-FS-21915 872-10643 01
- Diode-quad bridge for reactive transduc-  
ers and FM discriminators  
ARC-10364 872-10691 01
- Waveguide switch protector  
NPO-11592 872-10705 01
- Analysis of circuits including magnetic  
cores (MTRAC)  
NPO-11494 872-10724 02
- Frequency-to-amplitude converter: A  
concept  
MSC-12395 872-10729 01
- Improved measurement of depth  
perception  
M-FS-14133 872-10730 05
- CIRCULAR ORBITS**  
Interplanetary Trajectories, Encke Meth-  
od (ITEM)  
GSFC-11576 872-10604 09
- CIRCULAR TUBES**  
Velocity accelerator for particles  
NPO-11349 872-10082 03
- CIRCULATION**  
Closed-cycle power supply for fluidic  
control systems  
ARC-10480 872-10163 06
- Ear oximeter-transducer monitors four  
physiological responses  
XAC-05422 872-10224 05
- Oxygen reclamation with solid oxide  
electrolytes  
ARC-10487 872-10273 03
- CLAMPS**  
Chuck for delicate drills  
ARC-10660 872-10414 07
- Ultrasonic bone densitometer  
M-FS-20994 872-10450 05
- Vise to hold bones or other irregular  
objects  
ARC-10679 872-10569 07
- CLEANERS**  
Potentiometer, constant tension and  
lubrication device  
KSC-10723 872-10541 02
- CLEANING**  
Dry ice plug for hydraulic and pneu-  
matic pipe flushing  
MSC-12548 872-10496 06
- CLOCKS**  
Method to determine vented electro-  
chemical cell quality  
GSFC-11216 872-10396 04
- CLOSED CIRCUIT TELEVISION**  
Cine recording ophthalmoscope  
ARC-10399 872-10189 05
- CLOSED CYCLES**  
Closed-cycle power supply for fluidic  
control systems  
ARC-10480 872-10163 06
- CLOSED ECOLOGICAL SYSTEMS**  
Carbon dioxide concentrator  
ARC-10245 872-10194 05
- Oxygen reclamation with solid oxide  
electrolytes  
ARC-10487 872-10273 03
- Trace contaminant adsorption and  
sorber regeneration in closed ecological  
systems  
LANGLEY-10681 872-10328 04
- CLUTCHES**  
Stem clutch for motor driven valve  
LRL-10032 872-10345 07
- COAL**  
Fluidized-bed combustion reduces at-  
mospheric pollutants  
AEC-10085 872-10431 04
- COATINGS**  
Electrodes for sealed secondary  
batteries  
ARC-10238 872-10050 02
- Oxygen-layer structure improves lithium-  
doped silicon solar cells  
NPO-11403 872-10085 03
- Simple gas chromatographic system for  
analysis of microbial respiratory gases  
ARC-10403 872-10207 03
- Nonflammable potting, encapsulating  
and/or conformal coating compound  
MSC-13499 872-10337 04
- Laser beam deflection control: A  
concept  
MSC-13814 872-10411 02
- Sintered diamond compacts using  
metallic cobalt binders  
HQ-10706 872-10519 04
- Photoemissive coating  
M-FS-22003 872-10638 08
- COAXIAL CABLES**  
Heart catheter cable and connector  
ARC-10406 872-10200 05
- COAXIAL FLOW**  
Coaxial inverted geometry epitaxial  
transistor  
ARC-10330 872-10056 01
- Two-stage coaxial gas compressor  
ARC-10426 872-10210 06
- COBALT**  
Sintered diamond compacts using  
metallic cobalt binders  
HQ-10706 872-10519 04
- COBALT ALLOYS**  
Advanced protective coating for  
superalloys  
LEWIS-11473 872-10150 04
- Common bearing material has highest  
fatigue life at moderate temperature  
LEWIS-11592 872-10382 04
- Advanced alloy design technique: High  
temperature cobalt base superalloy  
LEWIS-10436 872-10514 04
- COBALT OXIDES**  
Catalyst for sodium chlorate  
decomposition  
ARC-10584 872-10305 04
- COCKPITS**  
Roll function in a flight simulator  
ARC-10557 872-10417 02
- CODING**  
GPEDIT  
GSFC-11308 872-10620 09
- COEFFICIENT OF FRICTION**  
Longitudinal friction forces in piping  
design  
M-FS-13754 872-10103 01
- COEFFICIENTS**  
Mechanically and thermally stable mas-  
er cavity resonator  
HQ-10790 872-10523 01
- COHERENT LIGHT**  
Particle detection with intensified laser  
beam  
HQ-10645 872-10516 03
- COHERENT RADIATION**  
Transmission of optical frequencies with  
minimal losses  
HQ-10541 872-10389 03
- Particle detection with intensified laser  
beam  
HQ-10645 872-10516 03
- Measurement of electron density and  
temperature in plasmas  
ARC-10598 872-10563 03
- COILS**  
Thermal analog device reduces machin-  
ing errors  
AEC-10080 872-10237 08
- Energy absorber uses expanded coiled  
tube  
AEC-10044 872-10239 06
- Alternating current losses in supercon-  
ducting coils  
M-FS-21129 872-10360 03
- COKE**  
Fluidized-bed combustion reduces at-  
mospheric pollutants  
AEC-10085 872-10431 04
- COLD GAS**  
Adaptive position control loop  
ARC-10255 872-10052 02
- Gas leak-detection system  
NPO-11405 872-10087 03
- COLLIMATION**  
An improved apochromatic wedge  
utilizing optical molecular contact  
bonding  
GSFC-11082 872-10388 03
- A new low-cost method for producing  
collimating mirrors  
LEWIS-11553 872-10513 08
- COLLIMATORS**  
Solar experiment alignment system  
ARC-10471 872-10020 03
- Solar sensor with autocollimator  
ARC-10148 872-10192 03
- Interferometric rotation sensor  
ARC-10278 872-10274 03
- COLLOIDS**  
Insolubilized enzymes for food  
synthesis  
ARC-10568 872-10247 04
- COLOR**  
Angular velocity and acceleration  
meter  
LEWIS-11466 872-10183 06
- Optical device for producing color line  
scan display from monochrome oscil-  
loscope traces  
LANGLEY-10896 872-10375 03
- Silver stain for electron microscopy  
ARC-10661 872-10415 05
- Carbon dioxide concentration indicator  
HQ-10582 872-10526 05
- A visual-display and storage device  
GSFC-10901 872-10647 02
- COLOR CENTERS**  
Improved magnesia for thermal control  
coatings  
ARC-10677 872-10424 04
- COLOR PHOTOGRAPHY**  
A rapid, precise, reciprocating-  
movement color filter system  
GSFC-11255 872-10497 07
- COLUMNS (PROCESS ENGINEERING)**  
Insolubilized enzymes for food  
synthesis  
ARC-10568 872-10247 04
- Microminiature gas chromatographic  
column  
ARC-10594 872-10306 04



- A permeable rotating-wheel solvent extractor  
LRL-10033 872-10343 04
- COMBUSTION**  
Remote control flare stack igniter for combustible gases  
M-FS-21675 872-10352 07  
Chemical kinetics computer program for static and flow reactions  
LEWIS-11467 872-10580 04
- COMBUSTION CHAMBERS**  
Airflow distribution control for improved turbine engine performance  
LEWIS-11593 872-10178 07  
Turbulent mixing film cooling correlation  
LEWIS-11417 872-10326 07  
Zone radiometer measurements on a model rocket exhaust plume  
M-FS-21693 872-10357 02  
Analysis and computer programs to calculate acoustic wave properties of baffled chambers  
LEWIS-11529 872-10577 09  
Metabolic simulation chamber  
HQ-10776 872-10658 05
- COMBUSTION EFFICIENCY**  
Air assist fuel nozzle reduces aircraft gas turbine engine emissions at idle operation  
LEWIS-11512 872-10434 07
- COMBUSTION PHYSICS**  
Fluidic systems may improve combustion in automotive engines  
ARC-10582 872-10250 06  
Zone radiometer measurements on a model rocket exhaust plume  
M-FS-21693 872-10357 02  
Air assist fuel nozzle reduces aircraft gas turbine engine emissions at idle operation  
LEWIS-11512 872-10434 07
- COMBUSTION PRODUCTS**  
Advanced protective coating for superalloys  
LEWIS-11473 872-10150 04  
Zone radiometer measurements on a model rocket exhaust plume  
M-FS-21693 872-10357 02  
Fluidized-bed combustion reduces atmospheric pollutants  
AEC-10085 872-10431 04  
Air assist fuel nozzle reduces aircraft gas turbine engine emissions at idle operation  
LEWIS-11512 872-10434 07  
Squib-operated disconnect  
NPO-11330 872-10713 06
- COMBUSTION STABILITY**  
Analysis and computer programs to calculate acoustic wave properties of baffled chambers  
LEWIS-11529 872-10577 09
- COMMAND SERVICE MODULES**  
Airlock caution and warning system  
M-FS-21576 872-10467 02
- COMMERCIAL AIRCRAFT**  
Survey of aircraft electrical power systems  
LEWIS-11678 872-10383 02
- COMMUNION**  
Plasma calcining of pigment particles for thermal control coatings  
M-FS-21267 872-10320 04
- COMMUNICATION**  
A study of the power spectral density of an FM signal  
M-FS-21070 872-10361 02
- COMMUNICATION EQUIPMENT**  
Broadband RF-distribution amplifier  
NPO-11401 872-10245 01  
Low distortion automatic phase control circuit  
M-FS-21671 872-10682 02
- COMPACTING**  
Determination of impact sensitivity of materials at high pressures  
MSC-13700 872-10216 07  
New compression molding process of thermosetting plastic compounds  
LANGLEY-10782 872-10356 08
- COMPARATOR CIRCUITS**  
Topological solution of bilateral switching networks  
ARC-10294 872-10055 01
- COMPATIBILITY**  
Use of thin plastic films at cryogenic temperatures  
LEWIS-11047 872-10038 04
- COMPENSATORS**  
Optical shutter for use in shock tubes  
ARC-10516 872-10128 03  
A piezoelectrically actuated ball valve  
ARC-10338 872-10204 06  
Titanium reinforced boron polyimide composite  
M-FS-21916 872-10353 04  
Compensator design for low-sensitivity linear time-invariant systems (COMPDES)  
M-FS-21652 872-10486 09
- COMPILERS**  
Standardization and qualification of computer programs for circuit design  
M-FS-21537 872-10142 09
- COMPONENT RELIABILITY**  
Electronic switching circuit uses complementary non-linear components  
AEC-10060 872-10236 01
- COMPOSITE MATERIALS**  
Specimen for high-temperature tensile tests  
ARC-10531 872-10028 04  
Structural design and stress analysis program for advanced composite filament-wound axisymmetric pressure vessels (COMTANK)  
NPO-11943 872-10073 09  
Nondestructive-test standards for evaluation of fiber-reinforced composites  
M-FS-21288 872-10157 04  
New polyimide polymer has excellent processing characteristics with improved thermo-oxidative and hydrolytic stabilities  
LEWIS-11323 872-10175 04  
Superior cryogenic insulation developed  
M-FS-21560 872-10187 04  
Improved method for producing metal-reinforced ceramics  
AEC-10070 872-10234 04  
Graphite and boron-reinforced composite materials data summary  
M-FS-21691 872-10294 04  
Inorganic glass ceramic slip rings  
M-FS-20711 872-10313 04  
Fabrication of uniaxial filament-reinforced epoxy tubes for structural application  
LANGLEY-10203 872-10340 04
- Titanium reinforced boron polyimide composite  
M-FS-21916 872-10353 04  
Fabrication of carbon film composites for high-strength structures  
ARC-10613 872-10423 04  
Chemical modification of poly(p-phenylene) for use in ablative compositions  
ARC-10135 872-10451 04  
Phase-change materials handbook  
M-FS-22064 872-10464 04  
Magnets with stabilized conductors  
HQ-10727 872-10465 03  
Equations to assess the impact resistance of fiber composites  
LEWIS-11486 872-10503 04
- COMPOSITE STRUCTURES**  
Thermally stable structural framework  
ARC-10612 872-10252 08  
Composite casting demonstration  
M-FS-21668 872-10266 04  
Boron aluminum composite structures  
M-FS-21571 872-10386 04
- COMPOUNDS**  
Improved synthesis of intermetal compounds  
HQ-10690 872-10172 04
- COMPRESSED AIR**  
Fluidic pressure regulators  
ARC-10474 872-10162 06
- COMPRESSED GAS**  
Gas leak-detection system  
NPO-11405 872-10087 03  
Two-stage coaxial gas compressor  
ARC-10426 872-10210 06
- COMPRESSIBILITY EFFECTS**  
A sonic transducer to detect fluid leaks  
KSC-10704 872-10376 01
- COMPRESSIBLE FLOW**  
Computer program for natural gas flow through nozzles  
LEWIS-11534 872-10362 09  
Sonic limitations and startup problems of heat pipes  
AEC-10036 872-10368 03
- COMPRESSING**  
Weight simulator  
ARC-10100 872-10046 05  
Development of a polyimide for use as a temperature and solvent resistant sealant  
M-FS-21325 872-10262 04  
New compression molding process of thermosetting plastic compounds  
LANGLEY-10782 872-10356 08  
A stagnation pressure probe for use in supersonic flow  
LANGLEY-11139 872-10543 06
- COMPRESSION LOADS**  
Method of determining thermal conductivity in multi-layer insulation systems  
M-FS-20213 872-10154 03
- COMPRESSION TESTS**  
Deflection resistance indicator  
M-FS-24010 872-10401 04
- COMPRESSIVE STRENGTH**  
Zero-leakage valves  
ARC-10506 872-10024 06  
Graphite and boron-reinforced composite materials data summary  
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MSC-14087 B72-10590 06

**CRYOGENIC FLUID STORAGE**

Thermal control for storage of cryogenic propellants in a multiple-tank system: A concept  
ARC-10560 B72-10278 03  
Design curve for liquid helium storage vessels  
LEWIS-11498 B72-10286 02  
Multipurpose top for liquid helium Dewar  
ARC-10533 B72-10302 03  
Overflow sensor for cryogenic-fluid vessels  
NPO-10619 B72-10554 03  
Internal capillary insulation for cryogenic tanks  
LEWIS-11234 B72-10626 06

**CRYOGENIC FLUIDS**

Use of thin plastic films at cryogenic temperatures  
LEWIS-11047 B72-10038 04  
A cryopump for cooling objects at a distance  
LRL-10031 B72-10314 03  
Overflow sensor for cryogenic-fluid vessels  
NPO-10619 B72-10554 03

- Internal capillary insulation for cryogenic tanks  
LEWIS-11234 B72-10626 06  
An optical quality meter suitable for cryogenic liquids  
LEWIS-11814 B72-10686 06
- CRYOGENIC MAGNETS**  
Wide-range nuclear magnetic resonance detector  
LEWIS-11513 B72-10478 03
- CRYOGENIC ROCKET PROPELLANTS**  
Rising-plate rheometer  
ARC-10524 B72-10026 03  
Cryogenic gel flow viscometer  
ARC-10523 B72-10180 03  
Thermal control for storage of cryogenic propellants in a common-bulkhead tank:  
A concept  
ARC-10558 B72-10276 03
- CRYOGENIC STORAGE**  
Thermal control for storage of cryogenic propellants in a common-bulkhead tank:  
A concept  
ARC-10558 B72-10276 03
- CRYOGENICS**  
A liquid radiation detector with high spatial resolution  
MSC-13965 B72-10034 03  
Use of thin plastic films at cryogenic temperatures  
LEWIS-11047 B72-10038 04  
A reliable liquid helium detector  
LEWIS-11487 B72-10145 01  
Low temperature scale for a 1 to 20 degree Kelvin region  
AEC-10007 B72-10146 03  
Method of determining thermal conductivity in multi-layer insulation systems  
M-FS-20213 B72-10154 03  
Superior cryogenic insulation developed  
M-FS-21560 B72-10187 04  
Turbopump radial and axial rotor support system  
M-FS-21495 B72-10264 07  
Adhesive for aluminum withstands cryogenic temperatures  
M-FS-16848 B72-10346 04  
Helium leak measurements using CO<sub>2</sub> as a carrier  
M-FS-21742 B72-10354 03  
Temperature control of a cryogenic bath  
HQ-10788 B72-10532 03
- CRYOPUMPING**  
A cryopump for cooling objects at a distance  
LRL-10031 B72-10314 03
- CRYSTAL DEFECTS**  
Improved magnesia for thermal control coatings  
ARC-10677 B72-10424 04
- CRYSTAL GROWTH**  
Improved synthesis of intermetal compounds  
HQ-10690 B72-10172 04  
Floating zone process for drawing small diameter fibers of refractory materials  
LEWIS-11380 B72-10491 04
- CRYSTAL LATTICES**  
Microminiature gas chromatographic column  
ARC-10594 B72-10306 04  
Improved magnesia for thermal control coatings  
ARC-10677 B72-10424 04
- CRYSTAL OPTICS**  
Acousto-optic filter for electronic laser tuning  
HQ-10715 B72-10520 03
- CRYSTAL OSCILLATORS**  
Crystal-controlled multivibrator  
NPO-11627 B72-10155 01
- CRYSTAL STRUCTURE**  
Manganese bismuth thin film for large capacity digital memories  
M-FS-21246 B72-10107 03  
Improved magnesia for thermal control coatings  
ARC-10677 B72-10424 04  
Proposed semiconductor film improvement  
HQ-10685 B72-10438 04
- CRYSTALLINITY**  
Angular velocity and acceleration meter  
LEWIS-11466 B72-10183 06  
Photoemissive coating  
M-FS-22003 B72-10638 08
- CRYSTALLIZATION**  
A stable liquid crystal for electro-optical displays  
HQ-10714 B72-10746 04
- CRYSTALS**  
High field CdS detector for infrared radiation  
LANGLEY-11027 B72-10725 04
- CUBES (MATHEMATICS)**  
Cubic spline functions for curve fitting  
LRL-10034 B72-10311 09
- CULTURE TECHNIQUES**  
Automatic agar tray inoculation device  
LANGLEY-11074 B72-10637 05
- CURIE TEMPERATURE**  
Manganese bismuth thin film for large capacity digital memories  
M-FS-21246 B72-10107 03
- CURING**  
High strength, medium density molded foam  
AEC-10053 B72-10235 04  
Devolatilization of polymer resins  
GSFC-11358 B72-10280 04  
A new vibration dampening adhesive  
MSC-17668 B72-10284 04  
New compression molding process of thermosetting plastic compounds  
LANGLEY-10782 B72-10356 08
- CURIUM 244**  
Radioisotope thermionic power supply for spacecraft  
ARC-10438 B72-10212 03
- CURRENT AMPLIFIERS**  
Oxygen pressure control for electrolysis cells  
ARC-10250 B72-10074 02  
Vibrating ribbon bolometer: A concept  
XAC-10768 B72-10170 03
- CURRENT DENSITY**  
High solar intensity radiometer  
LEWIS-11533 B72-10130 03  
Metastable atom probe for measuring electron beam density profiles  
M-FS-21593 B72-10485 03
- CURRENT DISTRIBUTION**  
Compensation of voltage drops in solid-state switches used with thermoelectric generators  
NPO-11388 B72-10138 01  
Cell for electrolysis of water vapor  
ARC-10521 B72-10166 03
- CURRENT REGULATORS**  
Pseudo-saturating power converter  
NPO-11368 B72-10042 01  
Circuit controls turn-on current  
NPO-11339 B72-10079 01
- CURVE FITTING**  
Cubic spline functions for curve fitting  
LRL-10034 B72-10311 09  
Computer program for fitting low-order polynomial splines by method of least squares  
LEWIS-11651 B72-10585 09
- CUTTERS**  
Tubing cutter  
NPO-11524 B72-10095 07  
Slitting flat conductor cables with the single cutting edge slitter  
M-FS-20111 B72-10575 07  
Portable beveling tool  
M-FS-16863 B72-10678 07
- CUTTING**  
Explosive cord  
M-FS-21928 B72-10293 08  
A tool for cutting ultra thin slits in metals  
KSC-10770 B72-10433 07  
Slitting flat conductor cables with the single cutting edge slitter  
M-FS-20111 B72-10575 07  
Portable beveling tool  
M-FS-16863 B72-10678 07
- CYANIDES**  
Improved zinc oxide thermal control coatings  
NPO-11139 B72-10711 04
- CYLINDRICAL BODIES**  
A permeable rotating-wheel solvent extractor  
LRL-10033 B72-10343 04  
New compression molding process of thermosetting plastic compounds  
LANGLEY-10782 B72-10356 08  
Portable beveling tool  
M-FS-16863 B72-10678 07  
Cylindrically shaped rope ladder  
M-FS-16319 B72-10688 07
- CYLINDRICAL CHAMBERS**  
Gyro spring augmentation system  
ARC-10496 B72-10010 06  
Water cavity degasser for electrolysis cells  
ARC-10244 B72-10246 03  
Linear accelerator: A concept  
KSC-10618 B72-10636 06  
Implantable drug therapy device: A concept  
NPO-11934 B72-10708 05
- CYLINDRICAL TANKS**  
Simple method for forming thin-wall pressure vessels  
ARC-10511 B72-10025 08  
Automatic water inventory, collecting, and dispensing unit  
LANGLEY-11071 B72-10663 06

## D

## DAMAGE

- Baffle to confine glow discharge in ion pump  
M-FS-21575 B72-10324 03

## DAMPING

- Inertial reference unit  
NPO-11518 B72-10094 02

Wide-range dynamic pressure sensor  
 ARC-10263 872-10196 03  
 Energy absorber uses expanded coiled tube  
 AEC-10044 872-10239 06  
 Control of oscillations in a discharge circuit  
 ARC-10556 872-10304 01  
 Improvements of Zeyded method for calculating flutter of flat panels  
 M-FS-20955 872-10399 06  
 Multiple reaction mass and isolation system  
 M-FS-24119 872-10441 06

**DATA ACQUISITION**

Circuit permits independent adjustment of gain and offset at constant input impedance  
 ARC-10348 872-10057 01  
 Prediction of ducted fan performance  
 ARC-10615 872-10064 09  
 Cavitation data for hydraulic equipment  
 LEWIS-11642 872-10384 07  
 Compression and R-wave detection of ECG/VCG data  
 MSC-14126 872-10391 05  
 A continuous physiological data collector  
 M-FS-20835 872-10402 05  
 High temperature permeameter for measuring magnetic properties  
 LEWIS-11609 872-10443 03  
 FORTRAN manpower account program  
 NPO-11973 872-10623 09  
 A system for automatic analysis of blood pressure data for digital computer entry  
 LEWIS-11751 872-10632 05  
 Self-calibrating remote atmospheric electromagnetic probe and data acquisition system  
 M-FS-21212 872-10665 03  
 Automatic method of measuring silicon-controlled-rectifier holding current  
 LEWIS-11898 872-10752 02

**DATA CONVERTERS**

High speed sequential decoder  
 ARC-10657 872-10568 09

**DATA CORRELATION**

Compression and R-wave detection of ECG/VCG data  
 MSC-14126 872-10391 05

**DATA MANAGEMENT**

Software control for large scale on-board checkout: A concept  
 MSC-13977 872-10015 09  
 Redundant data management system  
 M-FS-21831 872-10589 09  
 Design criteria monograph for pressurized metal cases  
 LEWIS-11835 872-10633 04

**DATA PROCESSING**

Wind trajectory tracing for air pollution studies (AIRPOL)  
 NPO-11892 872-10072 09  
 Standardization and qualification of computer programs for circuit design  
 M-FS-21537 872-10142 09  
 Crystal-controlled multivibrator  
 NPO-11627 872-10155 01  
 Graphite and boron-reinforced composite materials data summary  
 M-FS-21691 872-10294 04  
 Redundant data management system  
 M-FS-21831 872-10589 09

Significance arithmetic experimental package (SIGPAC)  
 GSFC-11499 872-10600 09  
 Program for standard statistical distributions  
 M-FS-21466 872-10602 09  
 Automatic computer subprogram selection from application-program libraries - ALTLIB  
 LANGLEY-11124 872-10607 09  
 Vortex-lattice FORTRAN program for estimating subsonic aerodynamic characteristics of complex planforms  
 LANGLEY-11047 872-10618 09  
 Method for nonlinear exponential regression analysis  
 M-FS-21965 872-10622 09  
 FORTRAN manpower account program  
 NPO-11973 872-10623 09  
 Computer program to generate attitude error equations for a gimbal platform  
 M-FS-21991 872-10624 09  
 A system for automatic analysis of blood pressure data for digital computer entry  
 LEWIS-11751 872-10632 05  
 An improved data transfer and storage technique for hybrid computation  
 M-FS-22043 872-10680 02  
 Chrysler improved numerical differencing analyzer for third generation computers  
 CINDA-3G 872-10721 09  
 MSC-11653 872-10721 09

**DATA PROCESSING EQUIPMENT**

Improved feedback shift register  
 NPO-10351 872-10226 01  
 Dual redundant core memory systems  
 MSC-13993 872-10261 09  
 Memory reduction through higher level language hardware  
 M-FS-21128 872-10350 09  
 Interferometer using RF switching matrix  
 GSFC-11051 872-10462 01  
 High speed sequential decoder  
 ARC-10657 872-10568 09  
 Source deck compression and update program (CAPS)  
 GSFC-11545 872-10619 09

**DATA RECORDERS**

Technique minimizes the effects of dropouts on telemetry records  
 NPO-11421 872-10088 02

**DATA RECORDING**

Very high speed direct-readout, control and recording system  
 M-FS-20658 872-10442 02  
 High temperature permeameter for measuring magnetic properties  
 LEWIS-11609 872-10443 03  
 Source deck compression and update program (CAPS)  
 GSFC-11545 872-10619 09

**DATA REDUCTION**

Source deck compression and update program (CAPS)  
 GSFC-11545 872-10619 09  
 A multielement probe for coincident temperature and pressure measurements  
 LEWIS-11775 872-10716 06

**DATA RETRIEVAL**

Source deck compression and update program (CAPS)  
 GSFC-11545 872-10619 09

**DATA SAMPLING**

Errors in hybrid computers.  
 M-FS-21289 872-10141 02

**DATA SMOOTHING**

Cubic spline functions for curve fitting  
 LRL-10034 872-10311 09

**DATA STORAGE**

Dual redundant core memory systems  
 MSC-13993 872-10261 09  
 Video information system  
 M-FS-21711 872-10267 09  
 Vidicon storage tube electrical input/output  
 MSC-14053 872-10285 02  
 A continuous physiological data collector  
 M-FS-20835 872-10402 05  
 A simplified, compact static shift register  
 HQ-10723 872-10591 02  
 Source deck compression and update program (CAPS)  
 GSFC-11545 872-10619 09  
 A visual-display and storage device  
 GSFC-10901 872-10647 02  
 An improved data transfer and storage technique for hybrid computation  
 M-FS-22043 872-10680 02

**DATA SYSTEMS**

Remote sensing X-ray spectrometer  
 MSC-13978 872-10016 03  
 Circuit permits independent adjustment of gain and offset at constant input impedance  
 ARC-10348 872-10057 01  
 Prediction of ducted fan performance  
 ARC-10615 872-10064 09  
 Wind trajectory tracing for air pollution studies (AIRPOL)  
 NPO-11892 872-10072 09  
 Dual redundant core memory systems  
 MSC-13993 872-10261 09  
 Very high speed direct-readout, control and recording system  
 M-FS-20658 872-10442 02  
 High speed sequential decoder  
 ARC-10657 872-10568 09  
 Source deck compression and update program (CAPS)  
 GSFC-11545 872-10619 09  
 Method for nonlinear exponential regression analysis  
 M-FS-21965 872-10622 09

**DATA TRANSMISSION**

Very high speed direct-readout, control and recording system  
 M-FS-20658 872-10442 02  
 An improved learning decoder  
 MSC-14070 872-10573 02  
 Redundant data management system  
 M-FS-21831 872-10589 09  
 Source deck compression and update program (CAPS)  
 GSFC-11545 872-10619 09  
 Self-calibrating remote atmospheric electromagnetic probe and data acquisition system  
 M-FS-21212 872-10665 03  
 Mathematical analysis for the performance assessment of space communication parameters, IBM-360 version  
 GSFC-11523 872-10675 09  
 An improved data transfer and storage technique for hybrid computation  
 M-FS-22043 872-10680 02

**DEAD RECKONING**

A simple dead-reckoning navigational system  
 M-FS-21165 872-10409 02

**DECELERATION**

Probe measures gas and liquid mass flux in high mass flow ratio two-phase flows

LEWIS-11270 B72-10546 06  
Seat belt restraint system

ARC-10519 B72-10692 06

**DECISION MAKING**

Integrated multi-path program analysis and cost technique (IMPACT)

M-FS-21880 B72-10676 09

**DECODERS**

High speed sequential decoder

ARC-10657 B72-10568 09

An improved learning decoder

MSC-14070 B72-10573 02

**DECOMPOSITION**

Catalyst for sodium chlorate decomposition

ARC-10584 B72-10305 04

Chemical kinetics computer program for static and flow reactions

LEWIS-11467 B72-10580 04

**DECOMPRESSION SICKNESS**

An efficient prebreathing apparatus for humans during decompression

MSC-14151 B72-10690 05

**DECONTAMINATION**

Purification of contaminated water by filtration through porous glass

ARC-10655 B72-10412 04

**DEEP SPACE NETWORK**

Deep space network

NPO-11562 B72-10043 01

Accurate measurement of telemetry performance

NPO-11457 B72-10089 02

**DEFECTS**

Nondestructive-test standards for evaluation of fiber-reinforced composites

M-FS-21288 B72-10157 04

Repeatable method of thermal stress fracture test of brittle materials

NUC-11019 B72-10258 06

Simple non-destructive tests for electroexplosive devices

NPO-11563 B72-10315 01

Improved optical filters for automated visual inspection

HQ-10720 B72-10521 03

**DEFLECTION**

Device for measuring electric fields

ARC-10164 B72-10148 03

Redirecting electromagnetic beams through wide angles

ARC-10602 B72-10307 03

Noncontact torque measurement using stroboscopic techniques

MSC-12282 B72-10332 07

Laser beam deflection control: A concept

MSC-13814 B72-10411 02

Analytical failure determination of flow-induced fatigue in bellows

M-FS-18178 B72-10488 06

**DEFORMATION**

Velocity accelerometer for particles

NPO-11349 B72-10082 03

Joining precipitation-hardened nickel-base alloys by friction welding

LEWIS-11514 B72-10288 08

Composite mobile system for holographic nondestructive testing

M-FS-21704 B72-10351 03

Computer program for calculating the temperature field of face seals

LEWIS-11110 B72-10483 09

**DEFORMETERS**

Bileaf mechanical strain gage

ARC-10303 B72-10197 07

**DEGASSING**

Water cavity degasser for electrolysis cells

ARC-10244 B72-10246 03

Free-radical solution-polymerization of trifluoronitrosomethane with tetrafluoroethylene

ARC-10567 B72-10419 04

**DEGRADATION**

Improved elastomer for use with oxygen difluoride

ARC-10528 B72-10027 04

Sheet plastic filters for solar cells

NPO-11464 B72-10090 04

Trace contaminant adsorption and sorbent regeneration in closed ecological systems

LANGLEY-10681 B72-10328 04

Study of in-situ degradation of thermal control surfaces

M-FS-20892 B72-10336 04

Alternating current losses in superconducting coils

M-FS-21129 B72-10360 03

Ultraviolet and thermally stable polymer compositions

ARC-10592 B72-10709 04

**DEGREES OF FREEDOM**

Reduction of fan noise: A concept

ARC-10312 B72-10040 06

Universal inverted flexure

ARC-10345 B72-10122 07

Space suit may have orthotic applications

ARC-10275 B72-10297 05

A proposed remote manipulator system: A concept

MSC-14245 B72-10733 06

**DEHUMIDIFICATION**

Aircrew oxygen system

ARC-10247 B72-10195 05

Solid amine compounds as sorbents for carbon dioxide: A concept

ARC-10571 B72-10421 04

**DEHYDRATED FOOD**

Quick, easy to prepare freeze-dried soups

MSC-14003 B72-10017 05

**DEHYDRATION**

Quick, easy to prepare freeze-dried soups

MSC-14003 B72-10017 05

**DELAY CIRCUITS**

Third order digital-to-analog converter

MSC-12458 B72-10030 02

**DEMAGNETIZATION**

Manganese bismuth thin film for large capacity digital memories

M-FS-21246 B72-10107 03

**DEMODULATION**

Accurate measurement of telemetry performance

NPO-11457 B72-10089 02

Differential input preamplifier

ARC-10489 B72-10165 01

**DENSIFICATION**

Fabrication of large ceramic electrolyte disks

ARC-10320 B72-10202 03

**DENSITOMETERS**

Ultrasonic bone densitometer

M-FS-20994 B72-10450 05

Fast response densitometer for measuring liquid density

M-FS-14478 B72-10664 02

**DENSITY**

Nondispersive infrared analyzer for specific gases in complex mixtures

ARC-10308 B72-10198 03

Fabrication of large ceramic electrolyte disks

ARC-10320 B72-10202 03

**DENSITY (MASS/VOLUME)**

An economical vent cover

M-FS-20692 B72-10348 07

Ultrasonic bone densitometer

M-FS-20994 B72-10450 05

Fast response densitometer for measuring liquid density

M-FS-14478 B72-10664 02

Boron-10 loaded inorganic shielding material

M-FS-22280 B72-10740 04

**DENSITY MEASUREMENT**

Fast response densitometer for measuring liquid density

M-FS-14478 B72-10664 02

**DEPOSITION**

Isotropic pyrolytic carbons

ARC-10532 B72-10029 04

**DESALINIZATION**

Stabilization of porous glass reverse-osmosis membranes

ARC-10646 B72-10309 04

**DESORPTION**

Adhesion theory review

AEC-10083 B72-10231 04

**DETECTION**

Remote sensing X-ray spectrometer

MSC-13978 B72-10016 03

Sensitive holographic detection of small aerodynamic perturbations

ARC-10422 B72-10209 03

Laboratory leak tester provides high sensitivity

AEC-10042 B72-10240 03

Lightning flash detection system

ARC-10562 B72-10272 02

**DETECTORS**

Software control for large scale on-board checkout: A concept

MSC-13977 B72-10015 09

Lightweight, broad-band spectrum analyzer

ARC-10405 B72-10060 01

A reliable liquid helium detector

LEWIS-11487 B72-10145 01

Two-axis leveling detector system

M-FS-21344 B72-10392 02

Wide-range nuclear magnetic resonance detector

LEWIS-11513 B72-10478 03

A magnetic mouse activity meter

HQ-10664 B72-10482 05

Electronic circuit detects left ventricular ejection events in cardiovascular system

LEWIS-11581 B72-10512 05

An approach to real-time process control of semiconductor wire-bonding

M-FS-21558 B72-10644 08

Fast response densitometer for measuring liquid density

M-FS-14478 B72-10664 02

**DETONATION**

Explosive cord

M-FS-21928 B72-10293 08

**DETONATION WAVES**

Velocity accelerator for particles

NPO-11349 B72-10082 03



**DEUTERIUM**

Direct analysis of hydrogen/deuterium mixtures: A concept

NPO-11322 B72-10244 03

Separation of gas mixtures by centrifugation

ARC-10449 B72-10270 03

Improved transmittance measurement with a magnesium oxide coated integrating sphere

LEWIS-11840 B72-10717 04

**DIAGNOSIS**

An efficient, simple dialyzer

HQ-10741 B72-10522 05

**DIAGRAMS**

Analog table look-up device identifies unknown terrain

MSC-13816 B72-10033 03

**DIALS**

An improved aesthesiometer

MSC-13609 B72-10032 05

Overlay board for control consoles

ARC-10007 B72-10191 02

Bileaf mechanical strain gage

ARC-10303 B72-10197 07

**DIALYSIS**

Small, low cost, artificial kidney

AEC-10011 B72-10371 05

An efficient, simple dialyzer

HQ-10741 B72-10522 05

**DIAMINES**

Development of a polyimide for use as a temperature and solvent resistant sealant

M-FS-21325 B72-10262 04

**DIAMONDS**

Cutting thin sections of bone

ARC-10555 B72-10303 05

Sintered diamond compacts using metallic cobalt binders

HQ-10706 B72-10519 04

Polishing is made cheaper by disposable diamond-impregnated abrasive cloth

MSC-14247 B72-10616 08

**DIAPHRAGMS**

Wide-range dynamic pressure sensor

ARC-10263 B72-10196 03

Automatic water inventory, collecting, and dispensing unit

LANGLEY-11071 B72-10663 06

**DIAPHRAGMS (MECHANICS)**

Electrodynamic actuators for rocket engine valves

ARC-10486 B72-10009 06

Hermetic isolation valves

ARC-10505 B72-10013 06

Improved elastomer for use with oxygen difluoride

ARC-10528 B72-10027 04

Use of thin plastic films at cryogenic temperatures

LEWIS-11047 B72-10038 04

Nematic liquid crystals for optical shutters: A concept

NPO-11367 B72-10083 03

Counter lung

ARC-10248 B72-10219 05

Improved high-performance shock tube

NPO-11885 B72-10242 03

Rapid evaluation of reverse-osmosis membranes

ARC-10659 B72-10413 04

Constant tension device for gravity simulation

M-FS-21618 B72-10466 06

Parallel-plate viscometer

NPO-11387 B72-10700 03

**DIATOMIC GASES**

Nondispersive infrared analyzer for specific gases in complex mixtures

ARC-10308 B72-10198 03

Diatomic infrared gasdynamic laser permits selection of wavelengths

ARC-10370 B72-10206 03

**DIBORANE**

Oxygen carrier for gas chromatographic analysis of inert gases in propellants

ARC-10574 B72-10249 04

Thermal control for storage of cryogenic propellants in a common-bulkhead tank:

A concept

ARC-10558 B72-10276 03

**DICHROISM**

Optical device for producing color line scan display from monochrome oscilloscope traces

LANGLEY-10896 B72-10375 03

**DIELECTRIC PROPERTIES**

Protective encapsulation of implantable biotelemetry units

ARC-10514 B72-10301 05

Frequency-wavelength calculator with table of dielectric properties

GSFC-11200 B72-10472 03

**DIELECTRICS**

Gate protective device for insulated gate field-effect transistors

M-FS-21626 B72-10149 01

Improved high voltage insulator for use in vacuum

LEWIS-11401 B72-10181 01

Liquid-helium-cooled Michelson interferometer

ARC-10554 B72-10217 03

An electrohydrodynamic heat pipe

ARC-10601 B72-10251 03

High voltage electrical insulation coating for refractory materials

LEWIS-11479 B72-10290 04

Transmission of optical frequencies with minimal losses

HQ-10541 B72-10389 03

Frequency-wavelength calculator with table of dielectric properties

GSFC-11200 B72-10472 03

Novel dielectric reduces corona breakdown in ac capacitors

M-FS-21486 B72-10505 01

**DIFFERENTIAL AMPLIFIERS**

A differential ECG amplifier with single-ended output

ARC-10411 B72-10061 05

Stable photosensor amplifiers

NPO-11561 B72-10100 01

Differential input preamplifier

ARC-10489 B72-10165 01

**DIFFERENTIAL EQUATIONS**

Algorithm for Liapunov stability analysis

ARC-10498 B72-10023 09

Program to determine radiating, nonadiabatic, inviscid flow over a blunt body by the method of integral relations

LANGLEY-11048 B72-10067 09

Carbon monoxide oxidation rates computed for automobile thermal reactor conditions

LEWIS-11638 B72-10137 04

Evaluating foam heterogeneity

AEC-10046 B72-10365 04

Analysis and computer programs to calculate acoustic wave properties of baffled chambers

LEWIS-11529 B72-10577 09

Chemical kinetics computer program for static and flow reactions

LEWIS-11467 B72-10580 04

**DIFFERENTIAL PRESSURE**

Method of determining thermal conductivity in multi-layer insulation systems

M-FS-20213 B72-10154 03

Vortex servovalve for fluidic or electrical input

ARC-10155 B72-10173 07

Two-stage coaxial gas compressor

ARC-10426 B72-10210 06

Miniature high pressure regulator

ARC-10428 B72-10211 07

Self-aligning, low-pressure sealing poppet valve

MSC-17745 B72-10538 07

**DIFFRACTION PATTERNS**

Interferometric rotation sensor

ARC-10278 B72-10274 03

Composite mobile system for holographic nondestructive testing

M-FS-21704 B72-10351 03

**DIFFUSION**

Oxygen-layer structure improves lithium-doped silicon solar cells

NPO-11403 B72-10085 03

Introduction of lithium into the front surface of solar cells

NPO-11404 B72-10086 02

Hybrid holographic system

M-FS-20074 B72-10260 03

New twisted intermetallic compound superconductor: A concept

LEWIS-11015 B72-10282 04

A thermocouple thermode for small animals

ARC-10550 B72-10559 05

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HQ-10745 B72-10755 01

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Structural design and stress analysis program for advanced composite filament-wound axisymmetric pressure vessels (COMTANK)  
NPO-11943 B72-10073 09  
Improved electrical spot terminals  
NPO-10034 B72-10492 01

EPOXY RESINS

Lightweight, broad-band spectrum analyzer  
ARC-10405 B72-10060 01

Pressure-probe assembly for wind tunnels

ARC-10569 B72-10248 03  
Miniature intermittent contact switch  
ARC-10450 B72-10271 01  
A new vibration dampening adhesive  
MSC-17668 B72-10284 04  
Fabrication of uniaxial filament-reinforced epoxy tubes for structural application  
LANGLEY-10203 B72-10340 04  
Titanium reinforced boron polyimide composite  
M-FS-21916 B72-10353 04  
Equations to assess the impact resistance of fiber composites  
LEWIS-11486 B72-10503 04  
New type of trifunctional alcohol  
NPO-10714 B72-10553 04  
Improved silver-zinc battery-terminal seals  
LEWIS-11615 B72-10581 06

EQUATIONS

A method for calculating the effects of design errors and measurement errors on pump performance  
LEWIS-11503 B72-10292 07

EQUILIBRIUM

Algorithm for Liapunov stability analysis  
ARC-10498 B72-10023 09  
Composite mobile system for holographic nondestructive testing  
M-FS-21704 B72-10351 03  
Aerotherm chemical equilibrium (ACE) computer program  
LEWIS-11722 B72-10739 09

EQUIPMENT SPECIFICATIONS

Prediction of ducted fan performance  
ARC-10615 B72-10064 09  
Low-friction ball-and-socket  
NPO-11348 B72-10081 08  
Selecting digital filters  
M-FS-20933 B72-10156 01  
New full-complement ball bearing lubrication technique  
MSC-13850 B72-10174 07  
Improved feedback shift register  
NPO-10351 B72-10226 01  
Quartz crystal microbalance use in biological studies  
NPO-11346 B72-10243 05  
Thermal control for storage of cryogenic propellants in a multiple-tank system: A concept  
ARC-10580 B72-10278 03  
Design curve for liquid helium storage vessels  
LEWIS-11498 B72-10286 02  
Cutting thin sections of bone  
ARC-10555 B72-10303 05  
A simple tachometer circuit  
ARC-10603 B72-10308 01  
Tool carrier  
M-FS-21469 B72-10319 07  
Ball bearing protector  
M-FS-21612 B72-10322 07  
Remote weighing device  
M-FS-21556 B72-10325 07  
Small turbine-type flowmeters for liquid hydrogen  
LEWIS-11535 B72-10331 06  
A permeable rotating-wheel solvent extractor  
LRL-10033 B72-10343 04  
Stem clutch for motor driven valve  
LRL-10032 B72-10345 07

Technique for producing wind-tunnel heat-transfer models

ARC-10658 B72-10349 08  
Improved universal electrical connector  
M-FS-14741 B72-10363 01  
Leak decay method of helium bombardment leak testing  
M-FS-24109 B72-10381 06  
Rotary shutter mechanism contains optical elements  
GSFC-11244 B72-10387 03  
Two-axis leveling detector system  
M-FS-21344 B72-10392 02  
Rapid evaluation of reverse-osmosis membranes  
ARC-10659 B72-10413 04  
Right angle mounted cold trap  
GSFC-11323 B72-10436 06  
Efficient wire-grid duplexer-polarized for CO<sub>2</sub> lasers  
GSFC-11403 B72-10440 03  
Combination pressure regulator and safety valve: A Concept  
MSC-14088 B72-10446 06  
High-speed, self-acting shaft seal (circumferential type)  
LEWIS-11274 B72-10447 07  
Miniature intermittent contact switch  
ARC-10450 B72-10452 01  
Latch mechanism  
M-FS-21606 B72-10457 08  
Interferometer using RF switching matrix  
GSFC-11051 B72-10462 01  
Ball detent mechanism  
M-FS-21735 B72-10470 07  
Dry ice plug for hydraulic and pneumatic pipe flushing  
MSC-12548 B72-10496 06  
No-err typing aids  
M-FS-15218 B72-10498 07  
Tandem steerable running gear  
M-FS-22012 B72-10499 07  
Magnetic circuitry mutual coupling probe  
M-FS-21664 B72-10535 02  
Advanced high-temperature electromagnetic pump  
LEWIS-11283 B72-10537 07  
Self-aligning, low-pressure sealing poppet valve  
MSC-17745 B72-10538 07  
Film holder for curved vacuum platen  
MSC-14120 B72-10542 07  
An improved gas extraction furnace  
MSC-14138 B72-10544 04  
A compact battery powered digital thermometer  
MSC-14084 B72-10545 02  
Sterile chamber operation with bio-isolator suit system  
LANGLEY-11054 B72-10547 05  
Helium window for shock-tube monochromators  
NPO-11852 B72-10556 03  
Restraint and locomotion aid  
ARC-10153 B72-10558 06  
Vise to hold bones or other irregular objects  
ARC-10679 B72-10569 07  
Laser mass spectrometer  
ARC-10687 B72-10571 03  
Oscillation of laser-beam intensity as observed with beam splitters  
ARC-10694 B72-10572 03  
Self-deploying boom  
GSFC-10566 B72-10574 07

- Leak test system  
M-FS-21788 B72-10576 06
- High pressure liquid gas pump  
MSC-14087 B72-10590 06
- Spark ultrasonic transducer  
M-FS-21233 B72-10594 04
- Precision machining of steel  
decahedrons  
M-FS-21361 B72-10597 07
- Oscillating hot-wire anemometer  
NPO-11634 B72-10609 02
- Computer program analyzes and monitors electrical power systems (POSIMO)  
GSFC-11505 B72-10610 09
- A transmitting and reflecting diffuser for ultraviolet light  
LANGLEY-10385 B72-10611 03
- Dc motor proportional control system for orthotic devices  
M-FS-21573 B72-10617 05
- Magnetometer uses bismuth-selenide  
LEWIS-11632 B72-10629 03
- Tissue holder for experimental and Demonstration Surgery  
LEWIS-11755 B72-10630 05
- Use of small turbine-type flowmeters to measure flow in large pipes  
LEWIS-11851 B72-10631 06
- Fill and vent quick disconnect  
M-FS-21822 B72-10645 07
- A simple, efficient resistance soldering apparatus  
GSFC-10913 B72-10649 08
- Automatic water inventory, collecting, and dispensing unit  
LANGLEY-11071 B72-10663 06
- Sprag solenoid brake  
M-FS-21846 B72-10669 06
- Improved lip seal for rotating shafts  
LEWIS-11602 B72-10672 07
- A shut-off valve for flexible tubing  
M-FS-21731 B72-10687 07
- New detection method for rolling element and bearing defects  
M-FS-21911 B72-10689 06
- Concentric-seating poppet  
NPO-11658 B72-10704 06
- Design of microstrip components by computer  
LANGLEY-11210 B72-10741 01
- Automated analysis of blood pressure measurements (Korotkov sound)  
MSC-13999 B72-10756 05
- EQUIPOTENTIALS**  
Precision voltage regulator  
NPO-11502 B72-10092 01
- EROSION**  
A protective coating for stainless steel  
LEWIS-11267 B72-10256 04
- Phosphorus in land-water systems  
AEC-10049 B72-10429 05
- ERROR ANALYSIS**  
Errors in hybrid computers  
M-FS-21289 B72-10141 02
- Thermal analog device reduces machining errors  
AEC-10080 B72-10237 08
- A method for calculating the effects of design errors and measurement errors on pump performance  
LEWIS-11503 B72-10292 07
- Significance arithmetic experimental package (SIGPAC)  
GSFC-11499 B72-10600 09
- Computer program to generate attitude error equations for a gimbaled platform  
M-FS-21991 B72-10624 09
- A linear programming manual  
HQ-10743 B72-10671 09
- ERROR CORRECTING DEVICES**  
Solar sensor with autocollimator  
ARC-10148 B72-10192 03
- No-err typing aids  
M-FS-15218 B72-10498 07
- ERROR DETECTION CODES**  
Techniques for improving reliability of computers  
M-FS-21326 B72-10109 02
- Flexible desk top computers using Large Scale Integration (L.S.I.) chips  
M-FS-21277 B72-10112 01
- ERROR FUNCTIONS**  
Errors in hybrid computers  
M-FS-21289 B72-10141 02
- ERROR SIGNALS**  
Techniques for improving reliability of computers  
M-FS-21326 B72-10109 02
- Illumination control system  
ARC-10527 B72-10167 02
- ERRORS**  
A method for calculating the effects of design errors and measurement errors on pump performance  
LEWIS-11503 B72-10292 07
- Interplanetary Trajectories, Encke Method (ITEM)  
GSFC-11576 B72-10604 09
- Two autowire versions for CDC-3200 and IBM-360  
GSFC-11526 B72-10608 09
- ESCAPE SYSTEMS**  
Cylindrically shaped rope ladder  
M-FS-16319 B72-10688 07
- ESTERS**  
New type of trifunctional alcohol  
NPO-10714 B72-10553 04
- ESTIMATING**  
Atmospheric density variations related to internal gravity waves  
M-FS-21637 B72-10143 03
- ETCHANTS**  
Improved photoetching fabrication method  
LEWIS-11268 B72-10745 08
- ETCHING**  
Annular objective apertures improve resolution of electron microscopes  
ARC-10448 B72-10171 03
- Microminiature gas chromatographic column  
ARC-10594 B72-10306 04
- Efficient wire-grid duplexer-polarized for CO2 lasers  
GSFC-11403 B72-10440 03
- Sputter etching of hemispherical bearings  
HQ-10712 B72-10534 08
- Improved photoetching fabrication method  
LEWIS-11268 B72-10745 08
- ETHANE**  
An absorption spectrum amplifier for determining gas composition  
HQ-10752 B72-10524 03
- ETHYL ALCOHOL**  
Stabilization of lactate dehydrogenase  
ARC-10415 B72-10062 05
- Promotion of dropwise condensation of ethyl alcohol, methyl alcohol, and acetone by polytetrafluoroethylene  
LANGLEY-10940 B72-10115 04
- ETHYLENE**  
Flexible, low-cost silicon solar cell arrays  
LEWIS-11069 B72-10177 02
- ETHYLENE OXIDE**  
Functionally terminated liquid nitroso fluorocarbon terpolymers  
M-FS-21539 B72-10493 04
- EUTECTICS**  
Boron aluminum composite structures  
M-FS-21571 B72-10386 04
- EVACUATING**  
Free-radical solution-polymerization of trifluoronitrosomethane with tetrafluoroethylene  
ARC-10567 B72-10419 04
- EVACUATING (VACUUM)**  
Helium leak measurements using CO2 as a carrier  
M-FS-21742 B72-10354 03
- New compression molding process of thermosetting plastic compounds  
LANGLEY-10782 B72-10356 08
- EVAPORATION**  
Beryllium thin films for resistor applications  
ARC-10485 B72-10021 01
- Restartable heat pipe  
ARC-10198 B72-10188 03
- EVAPORATIVE COOLING**  
A cryopump for cooling objects at a distance  
LRL-10031 B72-10314 03
- Freon 21 bearing lubrication and coolant system  
HQ-10302 B72-10651 06
- EVAPORATORS**  
Closed-cycle power supply for fluidic control systems  
ARC-10480 B72-10163 06
- EXCITATION**  
Pulse excitation of bolometer bridges  
ARC-10292 B72-10054 01
- Polymeric coatings using electronic excitation  
HQ-10698 B72-10257 04
- Alternating current losses in superconducting coils  
M-FS-21129 B72-10360 03
- Enhanced Lamb dip for absolute laser frequency stabilization  
HQ-10695 B72-10481 02
- EXHALATION**  
Aircrew oxygen system  
ARC-10247 B72-10195 05
- EXHAUST DIFFUSERS**  
Airflow distribution control for improved turbine engine performance  
LEWIS-11593 B72-10178 07
- EXHAUST GASES**  
Fluidic systems may improve combustion in automotive engines  
ARC-10582 B72-10250 06
- Safe transport of diborane in a dual refrigerant system: A concept  
ARC-10559 B72-10277 03
- Air assist fuel nozzle reduces aircraft gas turbine engine emissions at idle operation  
LEWIS-11512 B72-10434 07
- Squib-operated disconnect  
NPO-11330 B72-10713 06
- EXHAUST SYSTEMS**  
Carbon monoxide oxidation rates computed for automobile thermal reactor conditions  
LEWIS-11638 B72-10137 04

- Fluidic systems may improve combustion in automotive engines  
 ARC-10582 B72-10250 06  
 Remote control flare stack igniter for combustible gases  
 M-FS-21675 B72-10352 07  
 Experimental study of flow distribution with circumferential manifolds  
 LEWIS-11649 B72-10738 06
- EXOTHERMIC REACTIONS**  
 Comparison of catalyst activity  
 ARC-10493 B72-10201 04  
 Nonflammable and abrasion resistant coating process for glass fibers  
 MSC-14024 B72-10445 08
- EXPANDABLE STRUCTURES**  
 Miniature high pressure regulator  
 ARC-10428 B72-10211 07
- EXPELLANTS**  
 Dry ice plug for hydraulic and pneumatic pipe flushing  
 MSC-12548 B72-10496 06
- EXPERIMENTATION**  
 Software control for large scale on-board checkout: A concept  
 MSC-13977 B72-10015 09  
 Speed enhancement of complementary MOS devices  
 ARC-10387 B72-10184 01  
 Composite casting demonstration  
 M-FS-21668 B72-10266 04  
 Real-time pair-feeding of animals  
 ARC-10302 B72-10298 05
- EXPIRED AIR**  
 Carbon dioxide concentrator  
 ARC-10245 B72-10194 05
- EXPLOSIVE DEVICES**  
 Squib-actuated disconnect device  
 NPO-11544 B72-10097 06  
 Explosive cord  
 M-FS-21928 B72-10293 08  
 Fluid operated quick release mechanism  
 M-FS-20205 B72-10640 07
- EXPLOSIVE WELDING**  
 Small-scale explosive welding of aluminum  
 LANGLEY-10941 B72-10002 04
- EXPLOSIVES**  
 Velocity accelerator for particles  
 NPO-11349 B72-10082 03  
 Polymeric binder for explosives  
 AEC-10062 B72-10366 04  
 A four-panel enclosure protects from explosion  
 M-FS-21847 B72-10613 06
- EXPONENTIAL FUNCTIONS**  
 Indefinite integrals of products of some exponential and trigonometric functions  
 LEWIS-11493 B72-10225 09
- EXPOSURE**  
 Hybrid holographic system  
 M-FS-20074 B72-10260 03  
 Composite mobile system for holographic nondestructive testing  
 M-FS-21704 B72-10351 03
- EXPULSION BLADDERS**  
 PTFE films with improved flexibility  
 NPO-12028 B72-10551 04  
 Automatic water inventory, collecting, and dispensing unit  
 LANGLEY-11071 B72-10663 06
- EXTENSOMETERS**  
 Bileaf mechanical strain gage  
 ARC-10303 B72-10197 07
- EXTERNALLY BLOWN FLAPS**  
 Ejector nozzle with massive blowing  
 ARC-10621 B72-10693 06
- EXTRAPOLATION**  
 An empirical relationship for the penetration of 1 to 3 MeV electrons  
 LEWIS-11495 B72-10144 04
- EYE (ANATOMY)**  
 Scanning technique for tracking small eye-movements  
 ARC-10488 B72-10220 05  
 Tissue holder for experimental and Demonstration Surgery  
 LEWIS-11755 B72-10630 05
- EYE MOVEMENTS**  
 Projections of scan patterns on human retina  
 ARC-10181 B72-10193 05  
 Scanning technique for tracking small eye-movements  
 ARC-10488 B72-10220 05
- F**
- FABRICATION**  
 Simple method for forming thin-wall pressure vessels  
 ARC-10511 B72-10025 08  
 Use of thin plastic films at cryogenic temperatures  
 LEWIS-11047 B72-10038 04  
 Nondestructive-test standards for evaluation of fiber-reinforced composites  
 M-FS-21288 B72-10157 04  
 Flexible, low-cost silicon solar cell arrays  
 LEWIS-11069 B72-10177 02  
 Packaging concept for LSI beam lead integrated circuits  
 M-FS-21374 B72-10329 07  
 Nondestructive testing for braze voids in thin panels by use of special coatings  
 LANGLEY-10486 B72-10374 08  
 Guidelines for fabrication of hybrid microcircuits  
 M-FS-21964 B72-10393 01  
 Improved silver-zinc battery-terminal seals  
 LEWIS-11615 B72-10581 06  
 Fabrication of cooled, graphite-lined structures  
 LEWIS-11741 B72-10593 08  
 Precision machining of steel decahedrons  
 M-FS-21361 B72-10597 07
- FABRICS**  
 Convoluted fabric for full-pressure gloves  
 ARC-10529 B72-10215 04  
 Nonflammable and abrasion resistant coating process for glass fibers  
 MSC-14024 B72-10445 08
- FABRY-PEROT INTERFEROMETERS**  
 Liquid-helium-cooled Michelson interferometer  
 ARC-10554 B72-10217 03
- FACTORIALS**  
 Optimizing designs of two-level factorial experiments given partial prior information (NAMER)  
 LEWIS-11708 B72-10726 09
- FAILURE**  
 Software control for large scale on-board checkout: A concept  
 MSC-13977 B72-10015 09
- FAILURE ANALYSIS**  
 Adhesion theory review  
 AEC-10083 B72-10231 04  
 Failure in glass  
 AEC-10088 B72-10364 04  
 Prediction of flow-induced failures of braided flexible hoses and bellows  
 M-FS-19004 B72-10407 06  
 Systems effectiveness evaluation program  
 HQ-10306 B72-10458 09  
 Analytical failure determination of flow-induced fatigue in bellows  
 M-FS-18178 B72-10488 06  
 A system for early warning of bearing failure  
 M-FS-21877 B72-10494 06  
 Redundant data management system  
 M-FS-21831 B72-10589 09  
 New detection method for rolling element and bearing defects  
 M-FS-21911 B72-10689 06
- FAILURE MODES**  
 Reliability analysis based on operational success criteria  
 ARC-10490 B72-10214 09  
 New detection method for rolling element and bearing defects  
 M-FS-21911 B72-10689 06
- FARADAY EFFECT**  
 Oxygen reclamation with solid oxide electrolytes  
 ARC-10487 B72-10273 03
- FASTENERS**  
 Tool carrier  
 M-FS-21469 B72-10319 07  
 Perload indicating turnbuckle  
 M-FS-21488 B72-10355 07  
 Quick-donning backpack harness  
 LANGLEY-10102 B72-10641 05
- FATIGUE (MATERIALS)**  
 Strain gage attachment by spot welding reduces the fatigue strength of Ti-6Al-4V, Rene 41, and Inconel X  
 LANGLEY-10930 B72-10339 04  
 Failure in glass  
 AEC-10088 B72-10364 04  
 Prediction of flow-induced failures of braided flexible hoses and bellows  
 M-FS-19004 B72-10407 06  
 Analytical failure determination of flow-induced fatigue in bellows  
 M-FS-18178 B72-10488 06  
 The weld-brazing metal joining process  
 LANGLEY-11072 B72-10683 08
- FATIGUE LIFE**  
 Common bearing material has highest fatigue life at moderate temperature  
 LEWIS-11592 B72-10382 04
- FATIGUE TESTS**  
 Strain gage attachment by spot welding reduces the fatigue strength of Ti-6Al-4V, Rene 41, and Inconel X  
 LANGLEY-10930 B72-10339 04  
 Common bearing material has highest fatigue life at moderate temperature  
 LEWIS-11592 B72-10382 04  
 A tool for cutting ultra thin slits in metals  
 KSC-10770 B72-10433 07
- FEED SYSTEMS**  
 Advanced high-temperature electromagnetic pump  
 LEWIS-11283 B72-10537 07

- Hydrophobic liquid/gas separator for heat pipes  
ARC-10656 872-10549 03
- FEEDBACK**  
Effect of thermal discharges on the mass energy balance of Lake Michigan  
AEC-10013 872-10004 03  
Inertial reference unit  
NPO-11518 872-10094 02  
Feedback control of variable conductance heat pipes  
ARC-10460 872-10169 03  
Vortex servovalve for fluidic or electrical input  
ARC-10155 872-10173 07
- FEEDBACK CIRCUITS**  
Wind tunnel buffet load measuring technique  
ARC-10495 872-10022 06  
Circuit permits independent adjustment of gain and offset at constant input impedance  
ARC-10348 872-10057 01  
Improved audio reproduction system  
ARC-10404 872-10059 01  
Stable photosensor amplifiers  
NPO-11561 872-10100 01  
Improved feedback shift register  
NPO-10351 872-10226 01
- FEEDBACK CONTROL**  
Adaptive position control loop  
ARC-10255 872-10052 02  
Oxygen pressure control for electrolysis cells  
ARC-10250 872-10074 02  
Differential input preamplifier  
ARC-10489 872-10165 01  
Counter lung  
ARC-10248 872-10219 05  
Scanning technique for tracking small eye-movements  
ARC-10488 872-10220 05  
Combination pressure regulator and safety valve: A concept  
MSC-14088 872-10446 06
- FEEDING (SUPPLYING)**  
Real-time pair-feeding of animals  
ARC-10302 872-10298 05
- FERRITES**  
Improved zinc oxide thermal control coatings  
NPO-11139 872-10711 04
- FERROMAGNETIC MATERIALS**  
Ferromagnetic solenoid with axial and radial displacement  
NPO-11738 872-10241 06  
Two-stage magnetometer measures weak magnetic fields  
AEC-10068 872-10370 01
- FERROMAGNETISM**  
Ferromagnetic-fluid logic devices  
ARC-10503 872-10011 06
- FERROUS METALS**  
Improved zinc oxide thermal control coatings  
NPO-11139 872-10711 04
- FIBER OPTICS**  
An approach to real-time process control of semiconductor wire-bonding  
M-FS-21558 872-10644 08
- FIBER STRENGTH**  
Floating zone process for drawing small diameter fibers of refractory materials  
LEWIS-11380 872-10491 04
- FIBERS**  
Nondestructive-test standards for evaluation of fiber-reinforced composites  
M-FS-21288 872-10157 04  
Equations to assess the impact resistance of fiber composites  
LEWIS-11486 872-10503 04  
High strength high modulus ceramic fiber  
M-FS-21266 872-10592 04
- FIELD COILS**  
Current switch has built-in time delay: A concept  
MSC-17324 872-10453 01
- FIELD EFFECT TRANSISTORS**  
A differential ECG amplifier with single-ended output  
ARC-10411 872-10061 05  
Stable photosensor amplifiers  
NPO-11561 872-10100 01  
Frequency switch keyed oscillator  
ARC-10412 872-10124 01  
Gate protective device for insulated gate field-effect transistors  
M-FS-21626 872-10149 01  
Differential input preamplifier  
ARC-10489 872-10165 01  
Low phase-shift amplifier  
NPO-11663 872-10185 01  
Aluminum nitride insulating films for MOSFET devices  
NPO-11859 872-10425 04  
Development of chip passivated monolithic complementary MISFET circuits with beam leads  
M-FS-22264 872-10696 01  
Irradiation of MOS-FET devices to provide desired logic functions  
GSFC-11061 872-10719 01  
Insulated-gate field-effect transistor strain sensor  
LANGLEY-11012 872-10731 01
- FILAMENT WINDING**  
Structural design and stress analysis program for advanced composite filament-wound axisymmetric pressure vessels (COMTANK)  
NPO-11943 872-10073 09  
New twisted intermetallic compound superconductor: A concept  
LEWIS-11015 872-10282 04
- FILAMENTS**  
Device for measuring electric fields  
ARC-10164 872-10148 03  
Titanium reinforced boron polyimide composite  
M-FS-21916 872-10353 04  
Floating zone process for drawing small diameter fibers of refractory materials  
LEWIS-11380 872-10491 04  
High strength high modulus ceramic fiber  
M-FS-21266 872-10592 04
- FILLERS**  
Removal of filler material from large high energy formed parts  
M-FS-16326 872-10104 06
- FILM CONDENSATION**  
Fabrication of carbon film composites for high-strength structures  
ARC-10613 872-10423 04
- FILM COOLING**  
Turbulent mixing film cooling correlation  
LEWIS-11417 872-10326 07
- FILM THICKNESS**  
Fabrication of carbon film composites for high-strength structures  
ARC-10613 872-10423 04  
Impact sensitivity of materials in contact with liquid and gaseous oxygen at high pressure  
M-FS-21930 872-10476 06  
Film handling system for laser scanner/recorder  
MSC-14121 872-10539 07
- FILMS**  
High speed, self-acting, face-contact shaft seal has low leakage and very low wear  
LEWIS-11598 872-10114 07  
An efficient, simple dialyzer  
HQ-10741 872-10522 05
- FILTERS**  
Voltage-tunable parallel-T filter for remote operation  
NPO-11165 872-10077 01  
Sheet plastic filters for solar cells  
NPO-11464 872-10090 04  
Two-stage coaxial gas compressor  
ARC-10426 872-10210 06  
A compact spectroradiometer for solar simulator measurements  
HQ-10683 872-10327 03  
A rapid, precise, reciprocating-movement color filter system  
GSFC-11255 872-10497 07  
Improved sampling of compressed gases for condensable hydrocarbon content  
KSC-10304 872-10540 06
- FILTRATION**  
Insolubilized enzymes for food synthesis  
ARC-10568 872-10247 04  
Stabilization of porous glass reverse-osmosis membranes  
ARC-10646 872-10309 04  
Purification of contaminated water by filtration through porous glass  
ARC-10655 872-10412 04
- FINGERS**  
Ultrasonic bone densitometer  
M-FS-20994 872-10450 05
- FINITE DIFFERENCE THEORY**  
Program for the transient response of ablating axisymmetric bodies including the effects of shape change  
LANGLEY-11049 872-10068 09
- FINITE ELEMENT METHOD**  
Vibrational transfer functions for complex structures  
M-FS-20744 872-10648 09
- FIRE EXTINGUISHERS**  
Hermetic isolation valves  
ARC-10505 872-10013 06
- FIRE PREVENTION**  
Flame resistant elastic elastomeric fibers  
MSC-13923-4 872-10005 04  
Fire retardant polyisocyanurate foam  
ARC-10280 872-10269 04  
Polyimide foams provide thermal insulation and fire protection  
ARC-10464 872-10300 04  
Nonflammable potting, encapsulating and/or conformal coating compound  
MSC-13499 872-10337 04  
Airlock caution and warning system  
M-FS-21576 872-10467 02

An efficient prebreathing apparatus for humans during decompression  
MSC-14151 B72-10690 05

**FIREPROOFING**  
Halogenation of microcapsule walls  
ARC-10410 B72-10161 04

**FISSION PRODUCTS**  
Computer program for afterheat temperature distribution for mobile nuclear power plant  
LEWIS-11693 B72-10634 09

**FITTINGS**  
Laboratory leak tester provides high sensitivity  
AEC-10042 B72-10240 03

**FIXTURES**  
Three-point compound sine plate offers cost and weight savings  
MSC-15818 B72-10118 07  
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ARC-10679 B72-10569 07

**FLAME DEFLECTORS**  
A four-panel enclosure protects from explosion  
M-FS-21847 B72-10613 06

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Flame resistant elastic elastomeric fibers  
MSC-13923-4 B72-10005 04  
Hydrogen eliminator  
ARC-10408 B72-10208 03  
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ARC-10280 B72-10269 04  
Nonflammable and abrasion resistant coating process for glass fibers  
MSC-14024 B72-10445 08

**FLANGES**  
Simple method for forming thin-wall pressure vessels  
ARC-10511 B72-10025 08  
Compensating subreflector for two-reflector antennas: A concept  
NPO-11503 B72-10093 06  
Hydraulic valve lifter remover  
M-FS-21377 B72-10110 07  
Preventing oil migration in vacuum systems  
GSFC-11253 B72-10129 04  
Ion plating seals microcracks or porous metal components  
LEWIS-11657 B72-10397 04  
Portable beveling tool  
M-FS-16863 B72-10678 07  
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NPO-10117 B72-10703 03

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ARC-10312 B72-10040 06  
Integrated flight controller for light aircraft  
ARC-10456 B72-10213 06

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ARC-10181 B72-10193 05  
An absorption spectrum amplifier for determining gas composition  
HQ-10752 B72-10524 03

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LEWIS-11401 B72-10181 01

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M-FS-20111 B72-10575 07

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M-FS-20955 B72-10399 06

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LANGLEY-11069 B72-10395 05

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Longitudinal friction forces in piping design  
M-FS-13754 B72-10103 01  
Flexible, low-cost silicon solar cell arrays  
LEWIS-11069 B72-10177 02  
Heart catheter cable and connector  
ARC-10406 B72-10200 05  
Fire retardant polyisocyanurate foam  
ARC-10280 B72-10269 04  
Explosive cord  
M-FS-21928 B72-10293 08  
Space suit may have orthotic applications  
ARC-10275 B72-10297 05  
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MSC-14024 B72-10445 08  
Flexible shielding system for radiation protection  
LRL-10028 B72-10500 03  
PTFE films with improved flexibility  
NPO-12028 B72-10551 04  
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NPO-12029 B72-10552 06

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M-FS-21469 B72-10319 07  
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M-FS-19004 B72-10407 06  
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M-FS-21630 B72-10612 04

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An improved aesthesiometer  
MSC-13609 B72-10032 05  
Universal inverted flexure  
ARC-10345 B72-10122 07  
Analytical failure determination of flow-induced fatigue in bellows  
M-FS-18178 B72-10488 06  
Improved high-temperature gimbal joint  
LEWIS-11705 B72-10489 06

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ARC-10456 B72-10213 06

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ARC-10247 B72-10195 05

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ARC-10504 B72-10012 06

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ARC-10399 B72-10189 05  
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XAC-05422 B72-10224 05  
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ARC-10557 B72-10417 02

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NPO-11560 B72-10099 02  
Speed enhancement of complementary MOS devices  
ARC-10387 B72-10184 01

Electronic circuit detects left ventricular ejection events in cardiovascular system  
LEWIS-11581 B72-10512 05

A simplified, compact static shift register  
HQ-10723 B72-10591 02

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LEWIS-11380 B72-10491 04

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An economical vent cover  
M-FS-20692 B72-10348 07  
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M-FS-18401 B72-10105 06

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NPO-11401 B72-10245 01

Acousto-optic filter for electronic laser tuning  
HQ-10715 B72-10520 03

**FREQUENCY CONVERTERS**  
Frequency-to-amplitude converter: A concept  
MSC-12395 B72-10729 01

**FREQUENCY DISTRIBUTION**  
Program for standard statistical distributions  
M-FS-21466 B72-10602 09

**FREQUENCY MEASUREMENT**  
A sonic transducer to detect fluid leaks  
KSC-10704 B72-10376 01

**FREQUENCY MODULATION**  
Improved audio reproduction system  
ARC-10404 B72-10059 01

Narrowband, crystal-controlled biomedical telemetry system  
ARC-10708 B72-10255 01

An ingestible temperature-transmitter  
ARC-10583 B72-10275 01



## FREQUENCY RANGES

- A study of the power spectral density of an FM signal  
M-FS-21070 872-10361 02
- Laser frequency modulation with electron plasma  
AEC-10079 872-10373 03
- Diode-quad bridge for reactive transducers and FM discriminators  
ARC-10364 872-10691 01

## FREQUENCY RANGES

- Selecting digital filters  
M-FS-20933 872-10156 01
- Prediction of flow-induced failures of braided flexible hoses and bellows  
M-FS-19004 872-10407 06

## FREQUENCY RESPONSE

- Selecting digital filters  
M-FS-20933 872-10156 01
- Low frequency sinusoidal pressure generator  
LEWIS-11465 872-10477 01
- Universal dc signal conditioner  
MSC-17526 872-10510 02
- Computer method for identification of boiler transfer functions  
LEWIS-11808 872-10582 09
- Response of a panel structure to reverberant acoustic excitation  
M-FS-21774 872-10603 06

## FREQUENCY STABILITY

- Crystal-controlled multivibrator  
NPO-11627 872-10155 01
- Enhanced Lamb dip for absolute laser frequency stabilization  
HQ-10695 872-10481 02

## FRICTION

- Joining precipitation-hardened nickel-base alloys by friction welding  
LEWIS-11514 872-10288 08
- Latch mechanism  
M-FS-21606 872-10457 08

## FRICTION FACTOR

- Vortex servovalve for fluidic or electrical input  
ARC-10155 872-10173 07

## FRICTION REDUCTION

- Low-friction ball-and-socket  
NPO-11348 872-10081 08
- New full-complement ball bearing lubrication technique  
MSC-13850 872-10174 07
- Ball bearing protector  
M-FS-21612 872-10322 07
- Stem clutch for motor driven valve  
LRL-10032 872-10345 07
- Polyimide, bonded graphite fluoride: A new long life solid lubricant coating  
LEWIS-11864 872-10628 04

## FUEL CELLS

- Silver-chlorine fuel cell: A concept  
ARC-10491 872-10221 03
- Improved operation of rechargeable oxygen electrodes  
LEWIS-11619 872-10479 01
- Propulsion sizing program  
MSC-14016 872-10605 09
- Optimization of fluid line sizes with pumping power penalty IBM-360 computer program  
MSC-17930 872-10722 06

## FUEL COMBUSTION

- Carbon monoxide oxidation rates computed for automobile thermal reactor conditions  
LEWIS-11638 872-10137 04

- Fluidized-bed combustion reduces atmospheric pollutants  
AEC-10085 872-10431 04

## FUEL CONSUMPTION

- Optimized braking of landing vehicles with atmospheric drag  
NPO-11402 872-10084 06
- Fluidic systems may improve combustion in automotive engines  
ARC-10582 872-10250 06
- Air assist fuel nozzle reduces aircraft gas turbine engine emissions at idle operation  
LEWIS-11512 872-10434 07

## FUEL CONTROL

- Prolate spheroidal slosh model for fluid motion  
MSC-13864 872-10182 09

## FUEL INJECTION

- Main tank injection pressurization program  
LEWIS-11368 872-10069 09

## FUEL SYSTEMS

- Electrodynamic actuators for rocket engine valves  
ARC-10486 872-10009 06
- Carbon monoxide oxidation rates computed for automobile thermal reactor conditions  
LEWIS-11638 872-10137 04
- Fill and vent quick disconnect  
M-FS-21822 872-10645 07
- Propellant feed systems transients  
MSC-17848 872-10677 06

## FUEL TANK PRESSURIZATION

- Main tank injection pressurization program  
LEWIS-11368 872-10069 09
- Fluidic pressure regulators  
ARC-10474 872-10162 06
- Thermal control for storage of cryogenic propellants in a common-bulkhead tank: A concept  
ARC-10558 872-10276 03
- Safe transport of diborane in a dual refrigerant system: A concept  
ARC-10559 872-10277 03
- Liquid methane gelled with methanol and water reduces rate of nitrogen absorption  
LEWIS-11574 872-10330 06

## FUEL TANKS

- Thermally resistant polymers for fuel tank sealants  
M-FS-21232 872-10358 04
- Internal capillary insulation for cryogenic tanks  
LEWIS-11234 872-10626 06

## FUEL VALVES

- Electrodynamic actuators for rocket engine valves  
ARC-10486 872-10009 06
- Hermetic isolation valves  
ARC-10505 872-10013 06
- Zero-leakage valves  
ARC-10506 872-10024 06

## FUNCTIONS (MATHEMATICS)

- Optimization technique for problems with an inequality constraint  
ARC-10522 872-10222 09
- Computer program draws three-dimensional surfaces  
LEWIS-10482 872-10253 09

## FURNACES

- Improved synthesis of intermetal compounds  
HQ-10690 872-10172 04

## SUBJECT INDEX

- Simple, reproducible methods for thermal shock testing of brittle materials  
NUC-11020 872-10228 06

## FUSES

- New meter probes provide protection from high current power sources at potentials up to 600 volts  
LANGLEY-10804 872-10455 01

## G

## GADOLINIUM

- Improved intensifying screen reduces X-ray exposure  
AEC-10090 872-10232 03
- Boron-10 loaded inorganic shielding material  
M-FS-22280 872-10740 04

## GALACTIC RADIATION

- A study of radiation environment in space and its biological effects  
HQ-10798 872-10662 03

## GALLIUM ARSENIDES

- Advanced infrared photomultiplier  
M-FS-20941 872-10152 03
- Improved synthesis of intermetal compounds  
HQ-10690 872-10172 04
- A voltage-tunable three-terminal Gunn device  
HQ-10783 872-10518 01

## GALLIUM PHOSPHIDES

- Improved synthesis of intermetal compounds  
HQ-10690 872-10172 04
- High temperature gallium phosphide rectifiers  
LEWIS-11804 872-10673 01

## GAMMA RAYS

- A Compton scatter attenuation gamma ray spectrometer  
M-FS-21441 872-10487 03
- Fast response densitometer for measuring liquid density  
M-FS-14478 872-10664 02
- Irradiation of MOS-FET devices to provide desired logic functions  
GSFC-11061 872-10719 01

## GARMENTS

- Improved temperature control of liquid cooling garments  
MSC-13917 872-10281 05

## GAS ANALYSIS

- Oxygen carrier for gas chromatographic analysis of inert gases in propellants  
ARC-10574 872-10249 04
- An improved gas extraction furnace  
MSC-14138 872-10544 04

## GAS BEARINGS

- High speed, self-acting, face-contact shaft seal has low leakage and very low wear  
LEWIS-11598 872-10114 07
- Sputter etching of hemispherical bearings  
HQ-10712 872-10534 08

## GAS CHROMATOGRAPHY

- Simple gas chromatographic system for analysis of microbial respiratory gases  
ARC-10403 872-10207 03
- Direct analysis of hydrogen/deuterium mixtures: A concept  
NPO-11322 872-10244 03

# SUBJECT INDEX

# GAS STREAMS

Oxygen carrier for gas chromatographic analysis of inert gases in propellants  
 ARC-10574 B72-10249 04

Microminiature gas chromatographic column  
 ARC-10594 B72-10306 04

Chemical modification of poly(p-phenylene) for use in ablative compositions  
 ARC-10135 B72-10451 04

Gas-flow restrictor  
 NPO-10117 B72-10703 03

Transonic divider for gas chromatograph effluents  
 NPO-11479 B72-10706 03

**GAS COMPOSITION**  
 An absorption spectrum amplifier for determining gas composition  
 HQ-10752 B72-10524 03

An improved gas extraction furnace  
 MSC-14138 B72-10544 04

**GAS COOLING**  
 Freon 21 bearing lubrication and coolant system  
 HQ-10302 B72-10651 06

**GAS DENSITY**  
 Sensitive holographic detection of small aerodynamic perturbations  
 ARC-10422 B72-10209 03

Accurate measurement of gas volumes by liquid displacement  
 ARC-10723 B72-10699 03

**GAS DETECTORS**  
 Gas leak-detection system  
 NPO-11405 B72-10087 03

Laboratory leak tester provides high sensitivity  
 AEC-10042 B72-10240 03

Oxygen carrier for gas chromatographic analysis of inert gases in propellants  
 ARC-10574 B72-10249 04

Helium leak measurements using CO<sub>2</sub> as a carrier  
 M-FS-21742 B72-10354 03

**GAS DISCHARGES**  
 Properties of ionization breakdown of air at microwave frequencies and optimization of component dimensions for maximum microwave power  
 M-FS-21924 B72-10316 01

Ion plating seals microcracks or porous metal components  
 LEWIS-11657 B72-10397 04

High-intensity source of extreme ultraviolet  
 HQ-10754 B72-10528 03

**GAS DYNAMICS**  
 Water cavity degasser for electrolysis cells  
 ARC-10244 B72-10246 03

**GAS EVOLUTION**  
 Devolatilization of polymer resins  
 GSFC-11358 B72-10280 04

**GAS FLOW**  
 Pressure sensitive gas flow meter  
 ARC-10219 B72-10049 06

Dynamic valve to supply constant total thrust to two orifice jets  
 ARC-10239 B72-10120 07

Micro regulating ball valve  
 ARC-10295 B72-10121 06

Positive fast sealing union connections  
 LEWIS-11290 B72-10133 06

Advances in induction-heated plasma torch technology  
 LEWIS-11354 B72-10151 03

Closed-cycle power supply for fluidic control systems  
 ARC-10480 B72-10163 06

Vortex servovalve for fluidic or electrical input  
 ARC-10155 B72-10173 07

Miniature high pressure regulator  
 ARC-10428 B72-10211 07

Continuous monitor for gas ratios in a mixture  
 LEWIS-11095 B72-10229 05

Flow equation for porous plug and capillary tube flow restrictors  
 GSFC-11387 B72-10289 06

Optical enhancement of sensitivity in laser Doppler velocity systems  
 ARC-10653 B72-10310 03

A sonic transducer to detect fluid leaks  
 KSC-10704 B72-10376 01

Controlled flow assembly  
 M-FS-21716 B72-10404 07

Regenerable metallic oxide systems for removal of carbon dioxide: A concept  
 ARC-10570 B72-10420 04

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Combination pressure regulator and safety valve: A Concept  
 MSC-14088 B72-10446 06

Integrated monopropellant thruster  
 NPO-12004 B72-10502 06

Probe measures gas and liquid mass flux in high mass flow ratio two-phase flows  
 LEWIS-11270 B72-10546 06

Hydrophobic liquid/gas separator for heat pipes  
 ARC-10656 B72-10549 03

Chemical kinetics computer program for static and flow reactions  
 LEWIS-11467 B72-10580 04

Accurate measurement of gas volumes by liquid displacement  
 ARC-10723 B72-10699 03

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 NPO-10117 B72-10703 03

Transonic divider for gas chromatograph effluents  
 NPO-11479 B72-10706 03

**GAS GENERATORS**  
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 ARC-10484 B72-10008 03

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 LEWIS-11680 B72-10437 06

**GAS HEATING**  
 Pulsed high-power arc heater with improved cathode and triggering mechanism  
 ARC-10173 B72-10048 03

**GAS INJECTION**  
 Remote control flare stack igniter for combustible gases  
 M-FS-21675 B72-10352 07

**GAS IONIZATION**  
 Properties of ionization breakdown of air at microwave frequencies and optimization of component dimensions for maximum microwave power  
 M-FS-21924 B72-10316 01

Novel dielectric reduces corona breakdown in ac capacitors  
 M-FS-21486 B72-10505 01

**GAS JETS**  
 Wide angle solar sensor  
 NPO-11341 B72-10080 01

Dynamic valve to supply constant total thrust to two orifice jets  
 ARC-10239 B72-10120 07

**GAS LASERS**  
 Diatomic infrared gasdynamic laser permits selection of wavelengths  
 ARC-10370 B72-10206 03

Enhanced Lamb dip for absolute laser frequency stabilization  
 HQ-10695 B72-10481 02

**GAS MASERS**  
 Mechanically and thermally stable maser cavity resonator  
 HQ-10790 B72-10523 01

A method of eliminating hydrogen maser wall shift  
 HQ-10663 B72-10670 03

**GAS MIXTURES**  
 Nondispersive infrared analyzer for specific gases in complex mixtures  
 ARC-10308 B72-10198 03

Comparison of catalyst activity  
 ARC-10493 B72-10201 04

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 LEWIS-11095 B72-10229 05

Water cavity degasser for electrolysis cells  
 ARC-10244 B72-10246 03

Separation of gas mixtures by centrifugation  
 ARC-10449 B72-10270 03

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 LEWIS-11467 B72-10580 04

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 NPO-11725 B72-10707 03

Reduction of noise in gyro outputs  
 NPO-11603 B72-10743 06

**GAS PIPES**  
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 LEWIS-11290 B72-10133 06

**GAS PRESSURE**  
 Pressure sensitive gas flow meter  
 ARC-10219 B72-10049 06

Fluidic pressure regulators  
 ARC-10474 B72-10162 06

Improved synthesis of intermetal compounds  
 HQ-10690 B72-10172 04

Two-stage coaxial gas compressor  
 ARC-10426 B72-10210 06

Miniature high pressure regulator  
 ARC-10428 B72-10211 07

Study of in-situ degradation of thermal control surfaces  
 M-FS-20892 B72-10336 04

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 KSC-10707 B72-10536 07

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 LEWIS-11270 B72-10546 06

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 M-FS-24109 B72-10381 06

**GAS STREAMS**  
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- Oscillating hot-wire anemometer  
NPO-11634 B72-10609 02  
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LEWIS-11775 B72-10716 06
- GAS TEMPERATURE**  
Main tank injection pressurization program  
LEWIS-11368 B72-10069 09  
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LEWIS-11598 B72-10114 07  
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ARC-10408 B72-10208 03  
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LEWIS-11110 B72-10483 09
- GAS TUBES**  
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LEWIS-11598 B72-10114 07  
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LEWIS-11593 B72-10178 07  
Computer program for calculating the temperature field of face seals  
LEWIS-11110 B72-10483 09
- GAS TURBINES**  
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LEWIS-11417 B72-10326 07  
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LEWIS-11237 B72-10405 09
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ARC-10505 B72-10013 06  
Dynamic valve to supply constant total thrust to two orifice jets  
ARC-10239 B72-10120 07  
Micro regulating ball valve  
ARC-10295 B72-10121 06  
Laboratory leak tester provides high sensitivity  
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- GAS-LIQUID INTERACTIONS**  
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- GAS-METAL INTERACTIONS**  
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ARC-10570 B72-10420 04
- GASES**  
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LEWIS-11327 B72-10134 01
- Continuous monitor for gas ratios in a mixture  
LEWIS-11095 B72-10229 05  
Remote control flare stack igniter for combustible gases  
M-FS-21675 B72-10352 07  
Evaluating foam heterogeneity  
AEC-10046 B72-10365 04  
Noncontaminating technique for making holes in existing process systems  
LEWIS-11595 B72-10385 07  
Nonmetallic impurities improve mechanical properties of vapor-deposited tungsten  
LEWIS-10800 B72-10454 04  
Low frequency sinusoidal pressure generator  
LEWIS-11465 B72-10477 01  
Novel dielectric reduces corona breakdown in ac capacitors  
M-FS-21486 B72-10505 01  
Improved sampling of compressed gases for condensable hydrocarbon content  
KSC-10304 B72-10540 06  
Hydrophobic liquid/gas separator for heat pipes  
ARC-10656 B72-10549 03  
Fluid operated quick release mechanism  
M-FS-20205 B72-10640 07
- GASKETS**  
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GSFC-11253 B72-10129 04  
Filter cassette for high volume air sampler  
LEWIS-11469 B72-10379 03
- GASTROINTESTINAL SYSTEM**  
Sensor capsule for diagnosis of gastric disorders  
HQ-10767 B72-10531 05
- GATES (CIRCUITS)**  
Improved device measures performance of batteries under load  
ARC-10252 B72-10051 02  
A differential ECG amplifier with single-ended output  
ARC-10411 B72-10061 05  
Voltage-tunable parallel-T filter for remote operation  
NPO-11165 B72-10077 01  
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NPO-11482 B72-10091 02  
Stable photosensor amplifiers  
NPO-11561 B72-10100 01  
Time-lapse camera for microscopy  
ARC-10423 B72-10125 05  
Gate protective device for insulated gate field-effect transistors  
M-FS-21626 B72-10149 01  
A voltage-tunable three-terminal Gunn device  
HQ-10783 B72-10518 01  
Insulated-gate field-effect transistor strain sensor  
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- GE 635 COMPUTER**  
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HQ-10306 B72-10458 09
- GEAR TEETH**  
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ARC-10413 B72-10179 07
- GEARS**  
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LEWIS-11483 B72-10136 04  
Improved system for measuring speed of rotating machinery  
ARC-10413 B72-10179 07
- GELATINS**  
Stabilization of lactate dehydrogenase  
ARC-10415 B72-10062 05  
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ARC-10410 B72-10161 04  
An ingestible temperature-transmitter  
ARC-10583 B72-10275 01
- GELATION**  
Liquid methane gelled with methanol and water reduces rate of nitrogen absorption  
LEWIS-11574 B72-10330 06
- GELLED PROPELLANTS**  
Liquid methane gelled with methanol and water reduces rate of nitrogen absorption  
LEWIS-11574 B72-10330 06  
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- GELLED ROCKET PROPELLANTS**  
Rising-plate rheometer  
ARC-10524 B72-10026 03  
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ARC-10523 B72-10180 03
- GEOCENTRIC COORDINATES**  
Geometric field-line calculations  
GSFC-11597 B72-10674 09
- GEOCHEMISTRY**  
Remote sensing X-ray spectrometer  
MSC-13978 B72-10016 03
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- GEOLOGY**  
Hand-held photomicroscopy system  
ARC-10468 B72-10190 03
- GEOMETRY**  
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ARC-10498 B72-10023 09  
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ARC-10274 B72-10053 03  
Program for the transient response of ablating axisymmetric bodies including the effects of shape change  
LANGLEY-11049 B72-10068 09  
Optimization technique for problems with an inequality constraint  
ARC-10522 B72-10222 09
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LEWIS-11487 B72-10145 01  
Overlap diffusion for increasing phototransistor dynamic range  
M-FS-20407 B72-10347 01
- GIMBALS**  
Improved high-temperature gimbal joint  
LEWIS-11705 B72-10489 06  
Computer program to generate attitude error equations for a gimballed platform  
M-FS-21991 B72-10624 09  
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NPO-11603 B72-10743 06

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- Nematic liquid crystals for optical shutters: A concept  
NPO-11367 B72-10083 03
- Glass technology involved in the manufacture of magnetometer components  
GSFC-11283 B72-10132 03
- Interferometric rotation sensor  
ARC-10278 B72-10274 03
- Stabilization of porous glass reverse-osmosis membranes  
ARC-10646 B72-10309 04
- Inorganic glass ceramic slip rings  
M-FS-20711 B72-10313 04
- Nonflammable potting, encapsulating and/or conformal coating compound  
MSC-13499 B72-10337 04
- Failure in glass  
AEC-10088 B72-10364 04
- An improved apochromatic wedge utilizing optical molecular contact bonding  
GSFC-11082 B72-10388 03
- Purification of contaminated water by filtration through porous glass  
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- Radiation-induced nickel deposits  
LEWIS-10965 B72-10456 04
- Mechanically and thermally stable maser cavity resonator  
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- GLASS COATINGS**  
High voltage electrical insulation coating for refractory materials  
LEWIS-11479 B72-10290 04
- GLASS FIBERS**  
New polyimide polymer has excellent processing characteristics with improved thermo-oxidative and hydrolytic stabilities  
LEWIS-11323 B72-10175 04
- Adhesive for aluminum withstands cryogenic temperatures  
M-FS-16848 B72-10346 04
- Nonflammable and abrasion resistant coating process for glass fibers  
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MSC-17713 B72-10562 08
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HQ-10698 B72-10257 04
- Baffle to confine glow discharge in ion pump  
M-FS-21575 B72-10324 03
- Ion plating seals microcracks or porous metal components  
LEWIS-11657 B72-10397 04
- GLUCOSE**  
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ARC-10680 B72-10550 04
- GLYCEROLS**  
Stabilization of lactate dehydrogenase  
ARC-10415 B72-10062 05
- Fire retardant polyisocyanurate foam  
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- GOLD**  
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- Humidity resistant solar cell contacts  
HQ-10674 B72-10517 04
- Thin-film ultraviolet detector and spectrometer  
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- Boron-10 loaded inorganic shielding material  
M-FS-22280 B72-10740 04
- GOLD ALLOYS**  
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- GRADIENTS**  
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- GRAND TOURS**  
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ARC-10438 B72-10212 03
- GRANULAR MATERIALS**  
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M-FS-21288 B72-10157 04
- Fabrication of large ceramic electrolyte disks  
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- Repeatable method of thermal stress fracture test of brittle materials  
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- Graphite and boron-reinforced composite materials data summary  
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- Polyimide bonded graphite fluoride: A new long life solid lubricant coating  
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Gravitational gradiometer measures mass changes  
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NPO-11503 872-10093 06

**HUMAN BEINGS**  
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HQ-10776 872-10658 05

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MSC-14151 872-10690 05

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HQ-10777 872-10659 05

Temperature and humidity control of simulated human breath  
HQ-10778 872-10660 05

Simulated breath waveform control  
HQ-10779 872-10661 05

Implantable drug therapy device: A concept  
NPO-11934 872-10708 05

Gate protective device for SOS array  
HQ-10745 872-10755 01

**HUMAN CENTRIFUGES**  
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ARC-10399 872-10189 05

**HUMAN FACTORS ENGINEERING**  
Space-suit carbon dioxide absorption system: A concept  
ARC-10546 872-10168 05

Improved temperature control of liquid cooling garments  
MSC-13917 872-10281 05

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M-FS-21469 872-10319 07

A continuous physiological data collector  
M-FS-20835 872-10402 05

Restraint and locomotion aid  
ARC-10153 872-10558 06

## HYDRAULIC EQUIPMENT

A four-panel enclosure protects from explosion  
M-FS-21847 872-10613 06

Automation of Bosch reaction for CO<sub>2</sub> reduction  
M-FS-21674 872-10666 04

Seat belt restraint system  
ARC-10519 872-10692 06

Improved electrodes for skin contacts  
M-FS-21926 872-10698 05

Improved measurement of depth perception  
M-FS-14133 872-10730 05

**HUMAN PERFORMANCE**  
Simulated breath waveform control  
HQ-10779 872-10661 05

Improved measurement of depth perception  
M-FS-14133 872-10730 05

**HUMAN REACTIONS**  
New reaction tester accurate within 56 microseconds  
MSC-13604 872-10031 05

An improved aesthesiometer  
MSC-13609 872-10032 05

Loudness (annoyance), prediction procedure for steady sounds  
LEWIS-11761 872-10579 05

**HUMAN TOLERANCES**  
A study of radiation environment in space and its biological effects  
HQ-10798 872-10662 03

**HUMAN WASTES**  
Small, low cost, artificial kidney  
AEC-10011 872-10371 05

**HUMIDITY**  
Cell for electrolysis of water vapor  
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Humidity resistant solar cell contacts  
HQ-10674 872-10517 04

Breathing-metabolic simulator  
HQ-10766 872-10657 05

Temperature and humidity control of simulated human breath  
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**HYBRID COMPUTERS**  
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M-FS-21289 872-10141 02

An improved data transfer and storage technique for hybrid computation  
M-FS-22043 872-10680 02

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Quick, easy to prepare freeze-dried soups  
MSC-14003 872-10017 05

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Gyro spring augmentation system  
ARC-10496 872-10610 06

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LEWIS-11678 872-10383 02

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MSC-12548 872-10496 06

Self-aligning, low-pressure sealing poppet valve  
MSC-17745 872-10538 07

High pressure liquid gas pump  
MSC-14087 872-10590 06



Fill and vent quick disconnect  
M-FS-21822 B72-10645 07  
Automatic water inventory, collecting,  
and dispensing unit  
LANGLEY-11071 B72-10663 06  
A shut-off valve for flexible tubing  
M-FS-21731 B72-10687 07  
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**HYDRAULIC FLUIDS**  
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ARC-10496 B72-10010 06

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Propellant-powered actuator for gas  
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ARC-10484 B72-10008 03  
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ARC-10474 B72-10162 06  
Silver-chlorine fuel cell: A concept  
ARC-10491 B72-10221 03

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Carbon monoxide oxidation rates com-  
puted for automobile thermal reactor  
conditions  
LEWIS-11638 B72-10137 04  
Hydrogen eliminator  
ARC-10408 B72-10208 03  
Improved sampling of compressed  
gases for condensable hydrocarbon  
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KSC-10304 B72-10540 06  
New type of trifunctional alcohol  
NPO-10714 B72-10553 04

**HYDROCHLORIC ACID**  
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polystyrene latex beads: A concept  
MSC-13906 B72-10006 05

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Water impact loads  
M-FS-21955 B72-10621 09

**HYDRODYNAMICS**  
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bopump inducers  
LEWIS-11824 B72-10635 08

**HYDROFLUORIC ACID**  
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doped silicon solar cells  
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M-FS-21498 B72-10158 06  
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ARC-10521 B72-10166 03  
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analysis of microbial respiratory gases  
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ical properties of vapor-deposited  
tungsten  
LEWIS-10800 B72-10454 04  
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HQ-10790 B72-10523 01  
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MSC-14016 B72-10605 09

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HQ-10663 B72-10670 03

**HYDROGEN BONDS**  
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AEC-10083 B72-10231 04

**HYDROGEN COMPOUNDS**  
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hydrogen and oxygen  
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Direct analysis of hydrogen/deuterium  
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NPO-11322 B72-10244 03

**HYDROGEN IONS**  
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AEC-10088 B72-10364 04

**HYDROLOGY**  
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airborne measurement of chlorophyll  
ARC-10648 B72-10566 04

**HYDROLYSIS**  
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analysis of inert gases in propellants  
ARC-10574 B72-10249 04

**HYDROSTATIC PRESSURE**  
Simple method for forming thin-wall  
pressure vessels  
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ARC-10659 B72-10413 04

**HYDROSTATICS**  
New compression molding process of  
thermosetting plastic compounds  
LANGLEY-10782 B72-10356 08

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ammonium p-lithiophenoxide  
ARC-10553 B72-10223 04  
Silver stain for electron microscopy  
ARC-10661 B72-10415 05

**HYDROXYL COMPOUNDS**  
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ARC-10245 B72-10194 05  
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LRL-10034 B72-10311 09  
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NPO-11554 B72-10341 03

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LEWIS-11368 B72-10069 09

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Chemical kinetics computer program for  
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Computer program for fitting low-order  
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LEWIS-11651 B72-10585 09  
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perature distribution for mobile nuclear  
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Variable dimension automatic synthesis  
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MSC-17563 B72-10071 09  
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NPO-11892 B72-10072 09  
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dimensional surfaces  
LEWIS-10482 B72-10253 09  
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missions  
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M-FS-21652 B72-10486 09  
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GSFC-10909 B72-10599 09  
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GSFC-11397 B72-10606 09  
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MSC-17619 B72-10625 09  
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- Mathematical analysis for the performance assessment of space communication parameters, IBM-360 version  
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- Propellant feed systems transients  
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- Optimization of fluid line sizes with pumping power penalty IBM-360 computer program  
MSC-17930 872-10722 06
- Three bit mass spectral search program  
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- Computer program draws three-dimensional surfaces  
LEWIS-10482 872-10253 09
- IBM 7090 COMPUTER**  
Variable dimension automatic synthesis programs (VASP)  
ARC-10616 872-10065 09
- IBM 7094 COMPUTER**  
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- Design of two-dimensional sharp-edged-throat supersonic nozzle with boundary-layer correction  
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- Program for calculating laminar and turbulent boundary layers in arbitrary pressure gradients  
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- Computer program draws three-dimensional surfaces  
LEWIS-10482 872-10253 09
- Computer program for calculating the temperature field of face seals  
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- Computer programs for the design of liquid-to-liquid jet pumps  
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- Computer program for quasi-three-dimensional calculation of surface velocities and choking flow for turbomachine blade rows  
LEWIS-11635 872-10586 09
- IDENTIFYING**  
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ARC-10308 872-10198 03
- A magnetic mouse activity meter  
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- Remote control flare stack igniter for combustible gases  
M-FS-21675 872-10352 07
- Design criteria monograph on solid rocket motor igniters  
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LEWIS-11826 872-10715 06
- IGNITION TEMPERATURE**  
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- Impact sensitivity of materials in contact with liquid and gaseous oxygen at high pressure  
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- Annular objective apertures improve resolution of electron microscopes  
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- Cine recording ophthalmoscope  
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- Projections of scan patterns on human retina  
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- IMAGE DISSECTOR TUBES**  
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- IMAGE ENHANCEMENT**  
A sensitive image intensifier which uses inert gas  
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- IMAGE FILTERS**  
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- A dual-beam actinic light source for photosynthesis research  
ARC-10351 872-10205 05
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ARC-10509 872-10014 01
- Optical alignment of electrodes on electrical discharge machines  
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MSC-13906 872-10006 05
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- Equations to assess the impact resistance of fiber composites  
LEWIS-11486 872-10503 04
- Energy absorbing system for mechanical impacts  
NPO-10671 872-10712 06
- IMPACT TESTS**  
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- Low noise electromagnetic flowmeter  
M-FS-21291 872-10108 02
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- Diode-quad bridge for reactive transducers and FM discriminators  
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- IMPELLERS**  
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XAC-08505 872-10035 05
- Implantable drug therapy device: A concept  
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- IMPREGNATING**  
New polyimide polymer has excellent processing characteristics with improved thermo-oxidative and hydrolytic stabilities  
LEWIS-11323 872-10175 04
- Improved method for producing metal-reinforced ceramics  
AEC-10070 872-10234 04
- Novel dielectric reduces corona breakdown in ac capacitors  
M-FS-21486 872-10505 01

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M-FS-15218 872-10498 07

## IMPURITIES

Nonmetallic impurities improve mechanical properties of vapor-deposited tungsten  
LEWIS-10800 872-10454 04

## IN-FLIGHT MONITORING

Software control for large scale on-board checkout: A concept  
MSC-13977 872-10015 09

## INCOMPRESSIBLE FLUIDS

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NPO-11387 872-10700 03

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Strain gage attachment by spot welding reduces the fatigue strength of Ti-6Al-4V, Rene 41, and Inconel X  
LANGLEY-10930 872-10339 04  
Noncontaminating technique for making holes in existing process systems  
LEWIS-11595 872-10385 07

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ARC-10387 872-10184 01  
Optimization technique for problems with an inequality constraint  
ARC-10522 872-10222 09  
Computer program draws three-dimensional surfaces  
LEWIS-10482 872-10253 09  
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LEWIS-11708 872-10726 09

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NPO-11457 872-10089 02  
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New reaction tester accurate within 56 microseconds  
MSC-13604 872-10031 05  
A reliable liquid helium detector  
LEWIS-11487 872-10145 01  
Overlay board for control consoles  
ARC-10007 872-10191 02  
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ARC-10562 872-10272 02  
Improved temperature control of liquid cooling garments  
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## INDUCTION HEATING

Advances in induction-heated plasma torch technology  
LEWIS-11354 872-10151 03  
Simple, reproducible methods for thermal shock testing of brittle materials  
NUC-11020 872-10228 06  
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MSC-14138 872-10544 04

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Driver circuit for inductive loads  
ARC-10073 872-10268 01

## INDUSTRIAL MANAGEMENT

Manufacturing contamination prevention handbook  
M-FS-19113 872-10394 08

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A proposed remote manipulator system: A concept  
MSC-14245 872-10733 06

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Survey of information concerning large diameter deep hole drilling  
AEC-10051 872-10238 08  
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M-FS-19113 872-10394 08  
Technical management techniques for identification and control of industrial safety and pollution hazards  
M-FS-21883 872-10588 05

## INEQUALITIES

Optimization technique for problems with an inequality constraint  
ARC-10522 872-10222 09

## INERT ATMOSPHERE

Polymeric coatings using electronic excitation  
HQ-10698 872-10257 04

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Two-stage coaxial gas compressor  
ARC-10426 872-10210 06  
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ARC-10602 872-10307 03  
Seat belt restraint system  
ARC-10519 872-10692 06

## INERTIAL PLATFORMS

Precision machining of steel decahedrons  
M-FS-21361 872-10597 07

## INERTIAL REFERENCE SYSTEMS

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NPO-11502 872-10092 01  
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NPO-11518 872-10094 02

## INFORMATION MANAGEMENT

Source deck compression and update program (CAPS)  
GSFC-11545 872-10619 09

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Compression and R-wave detection of ECG/VCG data  
MSC-14126 872-10391 05

An improved learning decoder  
MSC-14070 872-10573 02

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ARC-10489 872-10165 01  
Direct analysis of hydrogen/deuterium mixtures: A concept  
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GSFC-11397 872-10606 09  
Improved transmittance measurement with a magnesium oxide coated integrating sphere  
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## INFRARED INSPECTION

Nondestructive-test standards for evaluation of fiber-reinforced composites  
M-FS-21288 872-10157 04

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Oxygen-layer structure improves lithium-doped silicon solar cells  
NPO-11403 872-10085 03  
Nondispersive infrared analyzer for specific gases in complex mixtures  
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ARC-10370 872-10206 03  
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GSFC-10525 872-10471 02  
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## INFRARED SPECTRA

Liquid-helium-cooled Michelson interferometer  
ARC-10554 872-10217 03

## INFRARED SPECTROPHOTOMETERS

Direct analysis of hydrogen/deuterium mixtures: A concept  
NPO-11322 872-10244 03

## INGESTION (BIOLOGY)

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ARC-10583 872-10275 01

## INITIATORS (EXPLOSIVES)

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NPO-11563 872-10315 01

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Advances in induction-heated plasma torch technology  
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Main tank injection pressurization program  
LEWIS-11368 872-10069 09  
Dispersion ring reduces injector orifice-to-orifice flow variation  
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Remote control flare stack igniter for combustible gases  
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ARC-10428 872-10211 07

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- Automatic agar tray inoculation device  
LANGLEY-11074 B72-10637 05

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- Initiation of polymerization by tetrabutylammonium p-lithiophenoxide  
ARC-10553 B72-10223 04

- Composite casting demonstration  
M-FS-21668 B72-10266 04

### INORGANIC PEROXIDES

- Oxygen plasmas used to synthesize superoxides  
ARC-10686 B72-10570 04

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- Circuit permits independent adjustment of gain and offset at constant input impedance  
ARC-10348 B72-10057 01

- A differential ECG amplifier with single-ended output  
ARC-10411 B72-10061 05

- Snap dynamics  
M-FS-21531 B72-10265 09

- Vidicon storage tube electrical input/output  
MSC-14053 B72-10285 02

- Universal dc signal conditioner  
MSC-17526 B72-10510 02

- An improved learning decoder  
MSC-14070 B72-10573 02

- Program to reduce the size of structural matrices  
MSC-17619 B72-10625 09

- FORTTRAN read package  
MSC-14161 B72-10750 09

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- Variable dimension automatic synthesis programs (VASP)  
ARC-10616 B72-10065 09

- Standardization and qualification of computer programs for circuit design  
M-FS-21537 B72-10142 09

- Systems effectiveness evaluation program  
HQ-10306 B72-10458 09

- Computer program for fitting low-order polynomial splines by method of least squares  
LEWIS-11651 B72-10585 09

- Redundant data management system  
M-FS-21831 B72-10589 09

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KSC-10768 B72-10685 07

### INSERTION LOSS

- A manually set magnetic wire counter  
AEC-10039 B72-10369 01

### INSULATED STRUCTURES

- Flexible shielding system for radiation protection  
LRL-10028 B72-10500 03

### INSULATION

- Electrical grounding bracket  
ARC-10041 B72-10045 01

- Flexible, low-cost silicon solar cell arrays  
LEWIS-11069 B72-10177 02

- An electrohydrodynamic heat pipe  
ARC-10601 B72-10251 03

- Magnet-wire wrapping tool for integrated circuits  
NPO-11815 B72-10426 07

- Improved electrical spot terminals  
NPO-10034 B72-10492 01

- Slitting flat conductor cables with the single cutting edge slitter  
M-FS-20111 B72-10575 07

- Energy absorbing system for mechanical impacts  
NPO-10671 B72-10712 06

### INSULATORS

- Improved high voltage insulator for use in vacuum  
LEWIS-11401 B72-10181 01

- Thin-film ultraviolet detector and spectrometer  
NPO-11432 B72-10701 03

### INTAKE SYSTEMS

- Electronic switching circuit uses complementary non-linear components  
AEC-10060 B72-10236 01

- Automatic air flow control in air conditioning ducts  
GSFC-11445 B72-10490 06

- Design criteria monograph on turbopump inducers  
LEWIS-11824 B72-10635 08

- Experimental study of flow distribution with circumferential manifolds  
LEWIS-11649 B72-10738 06

### INTEGRAL EQUATIONS

- Program to determine radiating, nonadiabatic, inviscid flow over a blunt body by the method of integral relations  
LANGLEY-11048 B72-10067 09

- Indefinite integrals of products of some exponential and trigonometric functions  
LEWIS-11493 B72-10225 09

### INTEGRATED CIRCUITS

- Coaxial inverted geometry epitaxial transistor  
ARC-10330 B72-10056 01

- Solid state television camera has no imaging tube  
M-FS-21553 B72-10254 02

- Nondestructive testing of microtab welds  
ARC-10176 B72-10296 02

- Microminiature gas chromatographic column  
ARC-10594 B72-10306 04

- Magnet-wire wrapping tool for integrated circuits  
NPO-11815 B72-10426 07

- Wide-range nuclear magnetic resonance detector  
LEWIS-11513 B72-10478 03

- Universal dc signal conditioner  
MSC-17526 B72-10510 02

- Improved optical filters for automated visual inspection  
HQ-10720 B72-10521 03

- Two autowire versions for CDC-3200 and IBM-360  
GSFC-11526 B72-10608 09

- Redundancy approaches in bubble domain memories  
M-FS-21915 B72-10643 01

- An approach to real-time process control of semiconductor wire-bonding  
M-FS-21558 B72-10644 08

- Dual field alignment display and control for electron micropattern generator  
M-FS-22118 B72-10646 01

- Two-speed deflection system for electron micropattern generator  
M-FS-22117 B72-10668 02

- Low distortion automatic phase control circuit  
M-FS-21671 B72-10682 02

## INTRAVENOUS PROCEDURES

- Development of chip passivated monolithic complementary MISFET circuits with beam leads  
M-FS-22264 B72-10696 01

### INTEGRATORS

- Precision voltage regulator  
NPO-11502 B72-10092 01

- Electronic integrator for gyro rate output voltages  
NPO-11499 B72-10555 01

### INTENSIFIERS

- Improved intensifying screen reduces X-ray exposure  
AEC-10090 B72-10232 03

### INTENSITY

- High-intensity source of extreme ultraviolet  
HQ-10754 B72-10528 03

- High field CdS detector for infrared radiation  
LANGLEY-11027 B72-10725 04

### INTERFACIAL TENSION

- Potentiometer, constant tension and lubrication device  
KSC-10723 B72-10541 02

### INTERFERENCE

- Composite mobile system for holographic nondestructive testing  
M-FS-21704 B72-10351 03

### INTERFEROMETERS

- Interferometric rotation sensor  
ARC-10278 B72-10274 03

- Interferometer using RF switching matrix  
GSFC-11051 B72-10462 01

- Unsupported thin film beam splitter  
GSFC-10525 B72-10471 02

### INTERFEROMETRY

- Sensitive holographic detection of small aerodynamic perturbations  
ARC-10422 B72-10209 03

- Radio direction finder  
NPO-11573 B72-10508 02

### INTERMEDIATE FREQUENCIES

- Signal to noise measurement circuit  
GSFC-11239 B72-10102 01

### INTERMETALLICS

- New twisted intermetallic compound superconductor: A concept  
LEWIS-11015 B72-10282 04

### INTERMITTENCY

- Oxygen pressure control for electrolysis cells  
ARC-10250 B72-10074 02

- Miniature intermittent contact switch  
ARC-10450 B72-10271 01

### INTERNAL COMBUSTION ENGINES

- Hydraulic valve lifter remover  
M-FS-21377 B72-10110 07

- Fluidic systems may improve combustion in automotive engines  
ARC-10582 B72-10250 06

### INTERPOLATION

- Third order digital-to-analog converter  
MSC-12458 B72-10030 02

### INTERRUPTION

- Software control for large scale on-board checkout: A concept  
MSC-13977 B72-10015 09

### INTRAVENOUS PROCEDURES

- Heart catheter cable and connector  
ARC-10406 B72-10200 05

- Intravenous fluid flow meter concept for zero gravity environment  
MSC-14123 B72-10461 05

**INVERTERS**

- Illumination control system
  - ARC-10527 872-10167 02
- INVESTIGATION**
  - Hydraulic modeling of heat dispersion in large lakes
  - AEC-10003 872-10039 03
- INVISCID FLOW**
  - Program to determine radiating, nonadiabatic, inviscid flow over a blunt body by the method of integral relations
  - LANGLEY-11048 872-10067 09
- INVOLUNTARY ACTIONS**
  - Scanning technique for tracking small eye-movements
  - ARC-10488 872-10220 05
- IODIDES**
  - Dispersion-strengthened chromium alloy
  - LEWIS-10982 872-10378 04
- IODINE**
  - Halogenation of microcapsule walls
  - ARC-10410 872-10161 04
- ION ACCELERATORS**
  - High voltage electrical insulation coating for refractory materials
  - LEWIS-11479 872-10290 04
- ION EMISSION**
  - High-intensity source of extreme ultraviolet
  - HQ-10754 872-10528 03
- ION ENGINES**
  - Improved high voltage insulator for use in vacuum
  - LEWIS-11401 872-10181 01
- ION IMPACT**
  - Cathode for use with low density gases
  - HQ-10687 872-10530 01
  - Prevention of cathode damage from positive ion bombardment
  - HQ-10688 872-10654 03
- ION PRODUCTION RATES**
  - A study of radiation environment in space and its biological effects
  - HQ-10798 872-10662 03
- ION PUMPS**
  - Baffle to confine glow discharge in ion pump
  - M-FS-21575 872-10324 03
- ION SOURCES**
  - Comparative performance of double-focus and quadrupole mass spectrometers
  - NPO-11689 872-10702 03
- IONIC COLLISIONS**
  - Properties of ionization breakdown of air at microwave frequencies and optimization of component dimensions for maximum microwave power
  - M-FS-21924 872-10316 01
- IONIZATION**
  - Device for measuring electric fields
  - ARC-10164 872-10148 03
  - Direct analysis of hydrogen/deuterium mixtures: A concept
  - NPO-11322 872-10244 03
  - Ion plating seals microcracks or porous metal components
  - LEWIS-11657 872-10397 04
  - New meter probes provide protection from high current power sources at potentials up to 600 volts
  - LANGLEY-10804 872-10455 01

**IONIZATION CHAMBERS**

- Simple dynamic electromagnetic radiation detector
  - LEWIS-11159 872-10227 03
  - Fast response densitometer for measuring liquid density
  - M-FS-14478 872-10664 02
- IONIZATION POTENTIALS**
  - Properties of ionization breakdown of air at microwave frequencies and optimization of component dimensions for maximum microwave power
  - M-FS-21924 872-10316 01
- IONIZED GASES**
  - Direct analysis of hydrogen/deuterium mixtures: A concept
  - NPO-11322 872-10244 03
- IONS**
  - Introduction of lithium into the front surface of solar cells
  - NPO-11404 872-10086 02
  - Mass separator for low velocity ions
  - ARC-10375 872-10123 03
  - Sputter etching of hemispherical bearings
  - HQ-10712 872-10534 08
- IRIDIUM**
  - Low temperature catalytic ignition of hydrogen and oxygen
  - ARC-10492 872-10127 03
- IRISES (MECHANICAL APERTURES)**
  - The thin film microwave iris
  - LANGLEY-10511 872-10548 02
- IRON**
  - Long-term drift of thermocouples at 1600 K
  - LEWIS-11471 872-10176 01
  - Wide-range dynamic pressure sensor
  - ARC-10263 872-10196 03
  - Magnetic-doped alloys with very large Seebeck coefficients
  - M-FS-21410 872-10318 04
- IRON OXIDES**
  - Sheet plastic filters for solar cells
  - NPO-11464 872-10090 04
- IRRADIANCE**
  - A compact spectroradiometer for solar simulator measurements
  - HQ-10683 872-10327 03
- IRRADIATION**
  - Sputter etching of hemispherical bearings
  - HQ-10712 872-10534 08
  - Erasable holographic medium using cis-trans isomerization
  - M-FS-22062 872-10720 03
  - High field CdS detector for infrared radiation
  - LANGLEY-11027 872-10725 04
- ISENTROPIC PROCESSES**
  - Computer program for natural gas flow through nozzles
  - LEWIS-11534 872-10362 09
- ISOCYANATES**
  - Fire retardant polyisocyanurate foam
  - ARC-10280 872-10269 04
- ISOLATION**
  - Hermetic isolation valves
  - ARC-10505 872-10013 06
  - Multiple reaction mass and isolation system
  - M-FS-24119 872-10441 06
  - Sterile chamber operation with bio-isolator suit system
  - LANGLEY-11054 872-10547 05

**ISOLATORS**

- Multiple reaction mass and isolation system
    - M-FS-24119 872-10441 06
  - ISOMERIZATION**
    - Erasable holographic medium using cis-trans isomerization
    - M-FS-22062 872-10720 03
  - ISOMERS**
    - Erasable holographic medium using cis-trans isomerization
    - M-FS-22062 872-10720 03
  - ISOTHERMAL PROCESSES**
    - High strength alloy for immediate temperature, 24 to 704 C. (75 to 1300 F), applications
    - LEWIS-11634 872-10344 04
  - ISOTROPISM**
    - Isogrid structure
    - M-FS-21567 872-10323 06
  - ISOTROPY**
    - Isotropic pyrolytic carbons
    - ARC-10532 872-10029 04
  - ITERATION**
    - Snap dynamics
    - M-FS-21531 872-10265 09
  - ITERATIVE NETWORKS**
    - Topological solution of bilateral switching networks
    - ARC-10294 872-10055 01
  - ITERATIVE SOLUTION**
    - Computer method for identification of boiler transfer functions
    - LEWIS-11808 872-10582 09
    - Computer program for fitting low-order polynomial splines by method of least squares
    - LEWIS-11651 872-10585 09
- J**
- JET AIRCRAFT NOISE**
    - Reduction of fan noise: A concept
    - ARC-10312 872-10040 06
    - Evaluation of jet engine noise
    - M-FS-21416 872-10263 03
  - JET AMPLIFIERS**
    - Fluidic pressure regulators
    - ARC-10474 872-10162 06
  - JET ENGINE FUELS**
    - Thermally resistant polymers for fuel tank sealants
    - M-FS-21232 872-10358 04
    - Air assist fuel nozzle reduces aircraft gas turbine engine emissions at idle operation
    - LEWIS-11512 872-10434 07
    - Heat transfer correlations for kerosene fuels and mixtures and physical properties for Jet A fuel
    - LEWIS-11652 872-10742 04
  - JET ENGINES**
    - Reduction of fan noise: A concept
    - ARC-10312 872-10040 06
    - Advanced protective coating for superalloys
    - LEWIS-11473 872-10150 04
    - Air assist fuel nozzle reduces aircraft gas turbine engine emissions at idle operation
    - LEWIS-11512 872-10434 07

**JET EXHAUST**

Air assist fuel nozzle reduces aircraft gas turbine engine emissions at idle operation

LEWIS-11512 872-10434 07

**JET FLAPS**

Dynamic valve to supply constant total thrust to two orifice jets

ARC-10239 872-10120 07

Ejector nozzle with massive blowing

ARC-10621 872-10693 06

**JET FLOW**

Investigations of a turbulent jet in a crossflow

LEWIS-11680 872-10437 06

**JET MIXING FLOW**

Investigations of a turbulent jet in a crossflow

LEWIS-11680 872-10437 06

**JET PROPULSION**

Evaluation of jet engine noise

M-FS-21416 872-10263 03

**JET PUMPS**

Computer programs for the design of liquid-to-liquid jet pumps

LEWIS-11679 872-10584 09

**JOINING**

Aluminum foil interconnects for solar cell panels

ARC-10374 872-10058 08

**JOINTS (JUNCTIONS)**

Space suit may have orthotic applications

ARC-10275 872-10297 05

Improved high-temperature gimbal joint

LEWIS-11705 872-10489 06

Flexible thermal device

M-FS-21630 872-10612 04

Portable beveling tool

M-FS-16863 872-10678 07

High torque bellows seal rotary drive

LEWIS-11813 872-10681 07

**JP-5 JET FUEL**

Advanced protective coating for superalloys

LEWIS-11473 872-10150 04

**JUNCTION TRANSISTORS**

Overlap diffusion for increasing photo-transistor dynamic range

M-FS-20407 872-10347 01

**JUPITER (PLANET)**

Differential input preamplifier

ARC-10489 872-10165 01

**JUPITER PROJECT**

Reliability analysis based on operational success criteria

ARC-10490 872-10214 09

**K**

**KALMAN FILTERS**

Variable dimension automatic synthesis programs (VASP)

ARC-10616 872-10065 09

**KIDNEYS**

Small, low cost, artificial kidney

AEC-10011 872-10371 05

**KLYSTRONS**

Arc protection system for high-power RF amplifiers

NPO-11560 872-10099 02

**KNUDSEN FLOW**

Trace contaminant adsorption and sorbent regeneration in closed ecological systems

LANGLEY-10681 872-10328 04

**KOVAR (TRADEMARK)**

Solar sensor with autocollimator

ARC-10148 872-10192 03

**KRYPTON**

Simple gas chromatographic system for analysis of microbial respiratory gases

ARC-10403 872-10207 03

**KRYPTON 85**

Gas leak-detection system

NPO-11405 872-10087 03

**L**

**LABORATORIES**

Real-time pair-feeding of animals

ARC-10302 872-10298 05

**LABORATORY EQUIPMENT**

Laboratory leak tester provides high sensitivity

AEC-10042 872-10240 03

Rapid evaluation of reverse-osmosis membranes

ARC-10659 872-10413 04

A magnetic mouse activity meter

HQ-10664 872-10482 05

Automatic agar tray inoculation device

LANGLEY-11074 872-10637 05

**LACTATES**

Stabilization of lactate dehydrogenase

ARC-10415 872-10062 05

**LADDERS**

Cylindrically shaped rope ladder

M-FS-16319 872-10688 07

**LAKES**

Effect of thermal discharges on the mass energy balance of Lake Michigan

AEC-10013 872-10004 03

Hydraulic modeling of heat dispersion in large lakes

AEC-10003 872-10039 03

**LAMB WAVES**

Enhanced Lamb dip for absolute laser frequency stabilization

HQ-10695 872-10481 02

**LAMINAR BOUNDARY LAYER**

Program for calculating laminar and turbulent boundary layers in arbitrary pressure gradients

LEWIS-11097 872-10111 09

**LAMINAR FLOW**

Design of two-dimensional sharp-edged-throat supersonic nozzle with boundary-layer correction

LEWIS-11636 872-10070 09

Program for calculating laminar and turbulent boundary layers in arbitrary pressure gradients

LEWIS-11097 872-10111 09

Heat transfer correlations for kerosene fuels and mixtures and physical properties for Jet A fuel

LEWIS-11652 872-10742 04

Reduction of noise in gyro outputs

NPO-11603 872-10743 06

**LAMINAR HEAT TRANSFER**

Computation of laminar heat transfer from gaseous plasmas in electromagnetic fields

NPO-11725 872-10707 03

**LAMINATES**

Vortex servovalve for fluidic or electrical input

ARC-10155 872-10173 07

New polyimide polymer has excellent processing characteristics with improved thermo-oxidative and hydrolytic stabilities

LEWIS-11323 872-10175 04

Convuluted fabric for full-pressure gloves

ARC-10529 872-10215 04

Nondestructive testing for braze voids in thin panels by use of special coatings

LANGLEY-10486 872-10374 08

Built-in bleeder system in laminated plastic structures

MSC-17713 872-10562 08

**LANDING MODULES**

Optimized braking of landing vehicles with atmospheric drag

NPO-11402 872-10084 06

**LANGUAGE PROGRAMMING**

Standardization and qualification of computer programs for circuit design

M-FS-21537 872-10142 09

Chrysler improved numerical differencing analyzer for third generation computers

CINDA-3G 872-10721 09

**LAPLACE TRANSFORMATION**

Effects of nonuniform swash-plate stiffness on coupled blade-control system dynamics and stability

LANGLEY-11068 872-10749 06

**LARGE SCALE INTEGRATION**

Topological solution of bilateral switching networks

ARC-10294 872-10055 01

Flexible desk top computers using Large Scale Integration (LSI) chips

M-FS-21277 872-10112 01

Packaging concept for LSI beam lead integrated circuits

M-FS-21374 872-10329 07

Memory reduction through higher level language hardware

M-FS-21128 872-10350 09

An approach to real-time process control of semiconductor wire-bonding

M-FS-21558 872-10644 08

**LASER OUTPUTS**

Diatomic infrared gasdynamic laser permits selection of wavelengths

ARC-10370 872-10206 03

Transmission of optical frequencies with minimal losses

HQ-10541 872-10389 03

Laser beam deflection control: A concept

MSC-13814 872-10411 02

Alignment microscope for rotating laser scanner

MSC-14118 872-10435 03

Efficient wire-grid duplexer-polarized for CO2 lasers

GSFC-11403 872-10440 03

Particle detection with intensified laser beam

HQ-10645 872-10516 03

Measurement of electron density and temperature in plasmas

ARC-10598 872-10563 03

Laser mass spectrometer

ARC-10687 872-10571 03

- Oscillation of laser-beam intensity as observed with beam splitters  
 ARC-10694 B72-10572 03  
 A bi-stable optical device  
 HQ-10701 B72-10655 03  
 Optimal read/write memory system components  
 M-FS-22044 B72-10697 01
- LASERS**  
 Experimental study of surface cracks  
 MSC-14032 B72-10019 04  
 Sensitive holographic detection of small aerodynamic perturbations  
 ARC-10422 B72-10209 03  
 Hybrid holographic system  
 M-FS-20074 B72-10260 03  
 Laser frequency modulation with electron plasma  
 AEC-10079 B72-10373 03  
 Laser beam deflection control: A concept  
 MSC-13814 B72-10411 02  
 Acousto-optic filter for electronic laser tuning  
 HQ-10715 B72-10520 03  
 An absorption spectrum amplifier for determining gas composition  
 HQ-10752 B72-10524 03  
 Film handling system for laser scanner/recorder  
 MSC-14121 B72-10539 07
- LATCHES**  
 Latch mechanism  
 M-FS-21606 B72-10457 08
- LATERAL CONTROL**  
 A cable stabilizer for outdoor elevators  
 KSC-10513 B72-10283 07
- LATEX**  
 Covalent bonding of antibodies of polystyrene latex beads: A concept  
 MSC-13906 B72-10006 05
- LATHES**  
 Electro-chemical grinding  
 LANGLEY-10801 B72-10744 08
- LATTICE VIBRATIONS**  
 Spark ultrasonic transducer  
 M-FS-21233 B72-10594 04
- LAUNCH VEHICLES**  
 Rapid analysis of electric propulsion missions  
 ARC-10430 B72-10299 09
- LAYERS**  
 Nondestructive-test standards for evaluation of fiber-reinforced composites  
 M-FS-21288 B72-10157 04
- LEACHING**  
 Leaching of nitroso rubber material removes uncured polymer  
 MSC-17185 B72-10449 04
- LEAD (METAL)**  
 Explosive cord  
 M-FS-21928 B72-10293 08  
 Flexible shielding system for radiation protection  
 LRL-10028 B72-10500 03
- LEAD ALLOYS**  
 A simple, efficient resistance soldering apparatus  
 GSFC-10913 B72-10649 08
- LEAD TITANATES**  
 A sonic transducer to detect fluid leaks  
 KSC-10704 B72-10376 01
- LEAKAGE**  
 Zero-leakage valves  
 ARC-10506 B72-10024 06
- Gas leak-detection system  
 NPO-11405 B72-10087 03  
 High speed, self-acting, face-contact shaft seal has low leakage and very low wear  
 LEWIS-11598 B72-10114 07  
 Micro regulating ball valve  
 ARC-10295 B72-10121 06  
 Laboratory leak tester provides high sensitivity  
 AEC-10042 B72-10240 03  
 Properties of ionization breakdown of air at microwave frequencies and optimization of component dimensions for maximum microwave power  
 M-FS-21924 B72-10316 01  
 Helium leak measurements using CO<sub>2</sub> as a carrier  
 M-FS-21742 B72-10354 03  
 A sonic transducer to detect fluid leaks  
 KSC-10704 B72-10376 01  
 Expandable coating cocoon leak detection system  
 M-FS-21848 B72-10380 06  
 Leak test system  
 M-FS-21788 B72-10576 06
- LEAST SQUARES METHOD**  
 Computer program for fitting low-order polynomial splines by method of least squares  
 LEWIS-11651 B72-10585 09  
 Method for nonlinear exponential regression analysis  
 M-FS-21965 B72-10622 09
- LEATHER**  
 Potentiometer, constant tension and lubrication device  
 KSC-10723 B72-10541 02
- LENSES**  
 Optical alignment of electrodes on electrical discharge machines  
 XAC-09489 B72-10036 07  
 Nematic liquid crystals for optical shutters: A concept  
 NPO-11367 B72-10083 03  
 Glass technology involved in the manufacture of magnetometer components  
 GSFC-11283 B72-10132 03  
 Conical electromagnetic radiation flux concentrator  
 M-FS-21613 B72-10147 03  
 Solar sensor with autocollimator  
 ARC-10148 B72-10192 03  
 Visual sensitivity tester  
 ARC-10329 B72-10203 05
- LEVEL (HORIZONTAL)**  
 Two-axis leveling detector system  
 M-FS-21344 B72-10392 02
- LEVELING**  
 Two-axis leveling detector system  
 M-FS-21344 B72-10392 02
- LEVERS**  
 Bileaf mechanical strain gage  
 ARC-10303 B72-10197 07
- LIAPUNOV FUNCTIONS**  
 Algorithm for Liapunov stability analysis  
 ARC-10498 B72-10023 09
- LIBRARIES**  
 Automatic computer subprogram selection from application-program libraries - ALTLIB  
 LANGLEY-11124 B72-10607 09  
 Three bit mass spectral search program  
 NPO-11960 B72-10747 09
- LIFE DETECTORS**  
 Particle detection by a light-scattering technique  
 ARC-10384 B72-10160 03  
 Simple gas chromatographic system for analysis of microbial respiratory gases  
 ARC-10403 B72-10207 03  
 A reusable prepositioned ATP reaction chamber  
 HQ-10660 B72-10525 05
- LIFE SCIENCES**  
 A reusable prepositioned ATP reaction chamber  
 HQ-10660 B72-10525 05
- LIFE SUPPORT SYSTEMS**  
 Cell for electrolysis of water vapor  
 ARC-10521 B72-10166 03  
 Solid amine compounds as sorbents for carbon dioxide: A concept  
 ARC-10571 B72-10421 04  
 Breathing-metabolic simulator  
 HQ-10766 B72-10657 05  
 Metabolic simulation chamber  
 HQ-10776 B72-10658 05  
 Automation of Bosch reaction for CO<sub>2</sub> reduction  
 M-FS-21674 B72-10666 04
- LIFT AUGMENTATION**  
 Ejector nozzle with massive blowing  
 ARC-10621 B72-10693 06
- LIFT DEVICES**  
 Ejector nozzle with massive blowing  
 ARC-10621 B72-10693 06
- LIFT DRAG RATIO**  
 Integrated flight controller for light aircraft  
 ARC-10456 B72-10213 06
- LIFT FANS**  
 Reduction of fan noise: A concept  
 ARC-10312 B72-10040 06  
 Bonding titanium to Rene 41 alloy  
 ARC-10311 B72-10041 08
- LIGHT (VISIBLE RADIATION)**  
 Interferometric rotation sensor  
 ARC-10278 B72-10274 03  
 Unsupported thin film beam splitter  
 GSFC-10525 B72-10471 02  
 A reusable prepositioned ATP reaction chamber  
 HQ-10660 B72-10525 05  
 A bi-stable optical device  
 HQ-10701 B72-10655 03  
 Erasable holographic medium using cis-trans isomerization  
 M-FS-22062 B72-10720 03
- LIGHT ADAPTATION**  
 Nematic liquid crystals for optical shutters: A concept  
 NPO-11367 B72-10083 03
- LIGHT AIRCRAFT**  
 Integrated flight controller for light aircraft  
 ARC-10456 B72-10213 06
- LIGHT AMPLIFIERS**  
 A sensitive image intensifier which uses inert gas  
 LRL-10024 B72-10312 03
- LIGHT BEAMS**  
 Pulse excitation of bolometer bridges  
 ARC-10292 B72-10054 01  
 Hybrid holographic system  
 M-FS-20074 B72-10260 03  
 Optical enhancement of sensitivity in laser Doppler velocity systems  
 ARC-10653 B72-10310 03

**LIGHT EMISSION**

Temperature compensation of light-emitting diodes  
ARC-10467 872-10218 01

**LIGHT MODULATION**

Hybrid holographic system  
M-FS-20074 872-10260 03

**LIGHT SCATTERING**

Particle detection by a light-scattering technique  
ARC-10384 872-10160 03  
Optical enhancement of sensitivity in laser Doppler velocity systems  
ARC-10653 872-10310 03

**LIGHT SOURCES**

Particle detection by a light-scattering technique  
ARC-10384 872-10160 03  
Solar sensor with autocollimator  
ARC-10148 872-10192 03  
Projections of scan patterns on human retina  
ARC-10181 872-10193 05  
A dual-beam actinic light source for photosynthesis research  
ARC-10351 872-10205 05  
An improved apochromatic wedge utilizing optical molecular contact bonding  
GSFC-11082 872-10388 03

**LIGHT TRANSMISSION**

Particle detection by a light-scattering technique  
ARC-10384 872-10160 03  
Hybrid holographic system  
M-FS-20074 872-10260 03  
Unsupported thin film beam splitter  
GSFC-10525 872-10471 02

**LIGHTNING**

Lightning flash detection system  
ARC-10562 872-10272 02  
Automatic lightning location system  
AEC-10077 872-10372 02

**LIMESTONE**

Fluidized-bed combustion reduces atmospheric pollutants  
AEC-10085 872-10431 04

**LIMITER CIRCUITS**

Signal to noise measurement circuit  
GSFC-11239 872-10102 01

**LINEAR ACCELERATORS**

Linear accelerator: A concept  
KSC-10618 872-10636 06

**LINEAR ARRAYS**

Piezoelectric actuator uses sequentially-excited multiple elements: A concept  
NPO-11527 872-10096 01

**LINEAR EQUATIONS**

An empirical relationship for the penetration of 1 to 3 MeV electrons  
LEWIS-11495 872-10144 04  
A linear programming manual  
HQ-10743 872-10671 09

**LINEAR PROGRAMMING**

A linear programming manual  
HQ-10743 872-10671 09

**LINEAR SYSTEMS**

Circuit permits independent adjustment of gain and offset at constant input impedance  
ARC-10348 872-10057 01  
Compensator design for low-sensitivity linear time-invariant systems (COMPDES)  
M-FS-21652 872-10486 09

**LIQUEFIED GASES**

Use of thin plastic films at cryogenic temperatures  
LEWIS-11047 872-10038 04  
A reliable liquid helium detector  
LEWIS-11487 872-10145 01  
Thermal control for storage of cryogenic propellants in a multiple-tank system: A concept  
ARC-10560 872-10278 03  
Combination pressure regulator and safety valve: A Concept  
MSC-14088 872-10446 06  
High pressure liquid gas pump  
MSC-14087 872-10590 06  
Freon 21 bearing lubrication and coolant system  
HQ-10302 872-10651 06

**LIQUID COOLING**

Improved temperature control of liquid cooling garments  
MSC-13917 872-10281 05  
A cryopump for cooling objects at a distance  
LRL-10031 872-10314 03  
Fill and vent quick disconnect  
M-FS-21822 872-10645 07

**LIQUID CRYSTALS**

Nematic liquid crystals for optical shutters: A concept  
NPO-11367 872-10083 03  
Angular velocity and acceleration meter  
LEWIS-11466 872-10183 06  
A stable liquid crystal for electro-optical displays  
HQ-10714 872-10746 04

**LIQUID FLOW**

Positive fast sealing union connections  
LEWIS-11290 872-10133 06  
An electrohydrodynamic heat pipe  
ARC-10601 872-10251 03  
A permeable rotating-wheel solvent extractor  
LRL-10033 872-10343 04

**LIQUID HELIUM**

A reliable liquid helium detector  
LEWIS-11487 872-10145 01  
Low temperature scale for a 1 to 20 degree Kelvin region  
AEC-10007 872-10146 03  
Liquid-helium-cooled Michelson interferometer  
ARC-10554 872-10217 03  
Design curve for liquid helium storage vessels  
LEWIS-11498 872-10286 02  
Multipurpose top for liquid helium Dewar  
ARC-10533 872-10302 03  
Magnetic-doped alloys with very large Seebeck coefficients  
M-FS-21410 872-10318 04

**LIQUID HYDROGEN**

Main tank injection pressurization program  
LEWIS-11368 872-10069 09  
Small turbine-type flowmeters for liquid hydrogen  
LEWIS-11535 872-10331 06  
Turbopump thermodynamic cooling  
M-FS-21597 872-10408 06  
Fast response densitometer for measuring liquid density  
M-FS-14478 872-10664 02

**LIQUID LEVELS**

Two-axis leveling detector system  
M-FS-21344 872-10392 02

**LIQUID METALS**

A liquid radiation detector with high spatial resolution  
MSC-13965 872-10034 03  
Composite casting demonstration  
M-FS-21668 872-10266 04

**LIQUID NITROGEN**

Longitudinal friction forces in piping design  
M-FS-13754 872-10103 01  
Manganese bismuth thin film for large capacity digital memories  
M-FS-21246 872-10107 03  
Preventing oil migration in vacuum systems  
GSFC-11253 872-10129 04  
Comparison of catalyst activity  
ARC-10493 872-10201 04  
Thermal control for storage of cryogenic propellants in a common-bulkhead tank: A concept  
ARC-10558 872-10276 03  
Safe transport of diborane in a dual refrigerant system: A concept  
ARC-10559 872-10277 03  
A cryopump for cooling objects at a distance  
LRL-10031 872-10314 03  
Titanium alloy stress corrosion cracking in presence of dinitrogen tetroxide  
M-FS-21113 872-10321 04  
Helium leak measurements using CO<sub>2</sub> as a carrier  
M-FS-21742 872-10354 03  
Free-radical solution-polymerization of trifluoronitrosomethane with tetrafluoroethylene  
ARC-10567 872-10419 04  
Right angle mounted cold trap  
GSFC-11323 872-10436 06  
Enhanced Lamb dip for absolute laser frequency stabilization  
HQ-10695 872-10481 02  
Dry ice plug for hydraulic and pneumatic pipe flushing  
MSC-12548 872-10496 06

**LIQUID OXYGEN**

Aircrew oxygen system  
ARC-10247 872-10195 05  
A cryopump for cooling objects at a distance  
LRL-10031 872-10314 03  
Impact sensitivity of materials in contact with liquid and gaseous oxygen at high pressure  
M-FS-21930 872-10476 06

**LIQUID PHASES**

Boiler for generating high quality vapor  
LEWIS-11345 872-10135 06

**LIQUID PROPELLANT ROCKET ENGINES**

Electrodynamic actuators for rocket engine valves  
ARC-10486 872-10009 06  
Main tank injection pressurization program  
LEWIS-11368 872-10069 09  
Combination throttle and shutoff valve  
M-FS-21513 872-10287 07  
Analysis and computer programs to calculate acoustic wave properties of baffled chambers  
LEWIS-11529 872-10577 09



- Design criteria monograph for high-load high-speed rolling-contact bearings  
LEWIS-11823 B72-10627 04
- Design criteria monograph on turbopump inducers  
LEWIS-11824 B72-10635 08
- LIQUID ROCKET PROPELLANTS**  
Fluidic pressure regulators  
ARC-10474 B72-10162 06  
Propellant feed systems transients  
MSC-17848 B72-10677 06
- LIQUID SLOSHING**  
Prolate spheroidal slosh model for fluid motion  
MSC-13864 B72-10182 09
- LIQUID SURFACES**  
Prolate spheroidal slosh model for fluid motion  
MSC-13864 B72-10182 09  
Two-axis leveling detector system  
M-FS-21344 B72-10392 02
- LIQUID-LIQUID INTERFACES**  
Preparation of stable colloidal dispersions in fluorinated liquids  
HQ-10580 B72-10529 04
- LIQUID-SOLID INTERFACES**  
Particle detection by a light-scattering technique  
ARC-10384 B72-10160 03
- LIQUID-VAPOR INTERFACES**  
Boiler for generating high quality vapor  
LEWIS-11345 B72-10135 06
- LIQUIDS**  
High-temperature, long-life thyratron  
LEWIS-11327 B72-10134 01  
Low frequency sinusoidal pressure generator  
LEWIS-11465 B72-10477 01  
Hydrophobic liquid/gas separator for heat pipes  
ARC-10656 B72-10549 03  
High strength high modulus ceramic fiber  
M-FS-21266 B72-10592 04  
Fast response densitometer for measuring liquid density  
M-FS-14478 B72-10664 02  
Diode-quad bridge for reactive transducers and FM discriminators  
ARC-10364 B72-10691 01  
Parallel-plate viscometer  
NPO-11387 B72-10700 03
- LITHIUM**  
Oxygen-layer structure improves lithium-doped silicon solar cells  
NPO-11403 B72-10085 03  
Introduction of lithium into the front surface of solar cells  
NPO-11404 B72-10086 02
- LITHIUM COMPOUNDS**  
Initiation of polymerization by tetrabutylammonium p-lithiophenoxide  
ARC-10553 B72-10223 04  
Electron beam chemistry produces high purity metals  
LEWIS-11639 B72-10439 04  
Radiation-induced nickel deposits  
LEWIS-10965 B72-10456 04
- LITHIUM ISOTOPES**  
Boron-10 loaded inorganic shielding material  
M-FS-22280 B72-10740 04
- LITHIUM NIOBATES**  
Acousto-optic filter for electronic laser tuning  
HQ-10715 B72-10520 03
- LITHOGRAPHY**  
Dual field alignment display and control for electron micropattern generator  
M-FS-22118 B72-10646 01  
Two-speed deflection system for electron micropattern generator  
M-FS-22117 B72-10668 02
- LOAD DISTRIBUTION (FORCES)**  
Water impact loads  
M-FS-21955 B72-10621 09
- LOADS (FORCES)**  
Determination of impact sensitivity of materials at high pressures  
MSC-13700 B72-10216 07  
Energy absorber uses expanded coiled tube  
AEC-10044 B72-10239 06  
Ball bearing protector  
M-FS-21612 B72-10322 07  
Perload indicating turnbuckle  
M-FS-21488 B72-10355 07  
Multiple reaction mass and isolation system  
M-FS-24119 B72-10441 06  
Latch mechanism  
M-FS-21606 B72-10457 08  
Study of high altitude plume impingement  
M-FS-21414 B72-10601 09  
Water impact loads  
M-FS-21955 B72-10621 09  
Fluid operated quick release mechanism  
M-FS-20205 B72-10640 07
- LOCKING**  
Latch mechanism  
M-FS-21606 B72-10457 08  
Adjustable locking device  
M-FS-21650 B72-10459 07  
Fluid operated quick release mechanism  
M-FS-20205 B72-10640 07
- LOCKS**  
Adjustable locking device  
M-FS-21650 B72-10459 07
- LOCOMOTION**  
Triangular wheel locomotion mechanism  
NPO-11366 B72-10714 06
- LOCOMOTIVES**  
Prolate spheroidal slosh model for fluid motion  
MSC-13864 B72-10182 09
- LOGIC CIRCUITS**  
New reaction tester accurate within 56 microseconds  
MSC-13604 B72-10031 05  
Topological solution of bilateral switching networks  
ARC-10294 B72-10055 01  
Technique minimizes the effects of dropouts on telemetry records  
NPO-11421 B72-10088 02  
Dual redundant core memory systems  
MSC-13993 B72-10261 09  
A rapid, precise, reciprocating-movement color filter system  
GSFC-11255 B72-10497 07  
Two autowire versions for CDC-3200 and IBM-360  
GSFC-11526 B72-10608 09  
Irradiation of MOS-FET devices to provide desired logic functions  
GSFC-11061 B72-10719 01  
Automated analysis of blood pressure measurements (Korotkov sound)  
MSC-13999 B72-10756 05
- LOGIC DESIGN**  
Two autowire versions for CDC-3200 and IBM-360  
GSFC-11526 B72-10608 09
- LOGICAL ELEMENTS**  
Ferromagnetic-fluid logic devices  
ARC-10503 B72-10011 06  
Memory reduction through higher level language hardware  
M-FS-21128 B72-10350 09
- LONG TERM EFFECTS**  
Drive mechanism for production of simulated human breath  
HQ-10777 B72-10659 05
- LOOPS**  
Stable photosensor amplifiers  
NPO-11561 B72-10100 01  
Hexapole magnet field analysis  
GSFC-10995 B72-10113 03  
Programmed physiological infusion system  
ARC-10447 B72-10126 05  
Closed-cycle power supply for fluidic control systems  
ARC-10480 B72-10163 06
- LOUDNESS**  
Loudness (annoyance), prediction procedure for steady sounds  
LEWIS-11761 B72-10579 05
- LOUDSPEAKERS**  
Electrodynamical actuators for rocket engine valves  
ARC-10486 B72-10009 06  
Improved audio reproduction system  
ARC-10404 B72-10059 01  
Scanning technique for tracking small eye-movements  
ARC-10488 B72-10220 05
- LOUVERS**  
Reduction of fan noise: A concept  
ARC-10312 B72-10040 06
- LOW COST**  
Low cost anti-galling bushings  
LEWIS-11724 B72-10359 08  
Radiation-induced nickel deposits  
LEWIS-10965 B72-10456 04  
Flexible shielding system for radiation protection  
LRL-10028 B72-10500 03  
Thermocouple tape  
LEWIS-11072 B72-10515 04  
High strength high modulus ceramic fiber  
M-FS-21266 B72-10592 04
- LOW FREQUENCIES**  
Advances in induction-heated plasma torch technology  
LEWIS-11354 B72-10151 03  
Nondispersive infrared analyzer for specific gases in complex mixtures  
ARC-10308 B72-10198 03  
Low frequency sinusoidal pressure generator  
LEWIS-11465 B72-10477 01
- LOW PASS FILTERS**  
Signal to noise measurement circuit  
GSFC-11239 B72-10102 01
- LOW PRESSURE**  
Ferromagnetic-fluid logic devices  
ARC-10503 B72-10011 06  
A piezoelectrically actuated ball valve  
ARC-10338 B72-10204 06  
Devolatilization of polymer resins  
GSFC-11358 B72-10280 04

**LOW TEMPERATURE**

Improved elastomer for use with oxygen difluoride  
 ARC-10528 B72-10027 04  
 Low temperature catalytic ignition of hydrogen and oxygen  
 ARC-10492 B72-10127 03  
 Hydrogen eliminator  
 ARC-10408 B72-10208 03  
 Adhesive for aluminum withstands cryogenic temperatures  
 M-FS-16848 B72-10346 04  
 Nonmetallic impurities improve mechanical properties of vapor-deposited tungsten  
 LEWIS-10800 B72-10454 04  
 Temperature control of a cryogenic bath  
 HQ-10788 B72-10532 03

**LOW TEMPERATURE ENVIRONMENTS**

Dry ice plug for hydraulic and pneumatic pipe flushing  
 MSC-12548 B72-10496 06

**LOW TEMPERATURE PHYSICS**

Thermal control for storage of cryogenic propellants in a multiple-tank system: A concept  
 ARC-10560 B72-10278 03

**LOW TEMPERATURE TESTS**

Right angle mounted cold trap  
 GSFC-11323 B72-10436 06

**LOW THRUST**

Rapid analysis of electric propulsion missions  
 ARC-10430 B72-10299 09

**LOW THRUST PROPULSION**

Final report on a study of low-density nozzle flows, with application to microthrust rockets  
 HQ-10761 B72-10748 06

**LOW WEIGHT**

Two-stage coaxial gas compressor  
 ARC-10426 B72-10210 06

**LUBRICANTS**

Lubricant selection for gear designers  
 LEWIS-11483 B72-10136 04  
 A tool for cutting ultra thin slits in metals.  
 KSC-10770 B72-10433 07  
 Nonflammable and abrasion resistant coating process for glass fibers  
 MSC-14024 B72-10445 08  
 Research on bearing lubricants for use in a high vacuum  
 M-FS-22119 B72-10469 04  
 Design criteria monograph for high-load high-speed rolling-contact bearings  
 LEWIS-11823 B72-10627 04  
 Freon 21 bearing lubrication and coolant system  
 HQ-10302 B72-10651 06

**LUBRICATING OILS**

New full-complement ball bearing lubrication technique  
 MSC-13850 B72-10174 07  
 Chuck for delicate drills  
 ARC-10660 B72-10414 07  
 Potentiometer, constant tension and lubrication device  
 KSC-10723 B72-10541 02

**LUBRICATION**

Freon 21 bearing lubrication and coolant system  
 HQ-10302 B72-10651 06

**LUBRICATION SYSTEMS**

Lubricant selection for gear designers  
 LEWIS-11483 B72-10136 04

New full-complement ball bearing lubrication technique  
 MSC-13850 B72-10174 07  
**LUMINAIRES**  
 Time-lapse camera for microscopy  
 ARC-10423 B72-10125 05  
 Glass technology involved in the manufacture of magnetometer components  
 GSFC-11283 B72-10132 03  
 Illumination control system  
 ARC-10527 B72-10167 02  
 Hand-held photomicroscopy system  
 ARC-10468 B72-10190 03  
 Vidicon storage tube electrical input/output  
 MSC-14053 B72-10285 02

**LUMINOUS INTENSITY**

High solar intensity radiometer  
 LEWIS-11533 B72-10130 03  
 Illumination control system  
 ARC-10527 B72-10167 02  
 High intensity solar cell radiometer  
 LEWIS-11549 B72-10480 01

**LUNAR COMPOSITION**

Remote sensing X-ray spectrometer  
 MSC-13978 B72-10016 03

**LUNAR GRAVITY SIMULATOR**

Constant tension device for gravity simulation  
 M-FS-21618 B72-10466 06

**LUNAR ROCKS**

Remote sensing X-ray spectrometer  
 MSC-13978 B72-10016 03

**LUNAR TOPOGRAPHY**

Remote sensing X-ray spectrometer  
 MSC-13978 B72-10016 03

**LUNGS**

Balanced-bellows spirometer  
 XAC-01547 B72-10279 05

**M**

**MACH NUMBER**

Continuous-flow variable-density wind tunnel facilities  
 NPO-11287 B72-10078 06

**MACHINE TOOLS**

Tubing cutter  
 NPO-11524 B72-10095 07  
 Hydraulic valve lifter remover  
 M-FS-21377 B72-10110 07  
 A tool for cutting ultra thin slits in metals  
 KSC-10770 B72-10433 07

**MACHINING**

Three-point compound sine plate offers cost and weight savings  
 MSC-15818 B72-10118 07  
 Universal inverted flexure  
 ARC-10345 B72-10122 07  
 A new low-cost method for producing collimating mirrors  
 LEWIS-11553 B72-10513 08  
 Machine finishes balls to high degree of roundness  
 M-FS-21448 B72-10595 08

**MAGNESIUM OXIDES**

Improved magnesia for thermal control coatings  
 ARC-10677 B72-10424 04  
 Improved transmittance measurement with a magnesium oxide coated integrating sphere  
 LEWIS-11840 B72-10717 04

**MAGNETIC COILS**

Separation of gas mixtures by centrifugation  
 ARC-10449 B72-10270 03  
 Two-stage magnetometer measures weak magnetic fields  
 AEC-10068 B72-10370 01  
 Laser beam deflection control: A concept  
 MSC-13814 B72-10411 02

**MAGNETIC CONTROL**

Preparation of stable colloidal dispersions in fluorinated liquids  
 HQ-10580 B72-10529 04

**MAGNETIC CORES**

Pseudo-saturating power converter  
 NPO-11368 B72-10042 01  
 Analysis of circuits including magnetic cores (MTRAC)  
 NPO-11494 B72-10724 02

**MAGNETIC FIELDS**

Circuit controls turn-on current  
 NPO-11339 B72-10079 01  
 Manganese bismuth thin film for large capacity digital memories  
 M-FS-21246 B72-10107 03  
 Low noise electromagnetic flowmeter  
 M-FS-21291 B72-10108 02  
 Hexapole magnet field analysis  
 GSFC-10995 B72-10113 03  
 Device for measuring electric fields  
 ARC-10164 B72-10148 03  
 Ferrofluidic solenoid with axial and radial displacement  
 NPO-11738 B72-10241 06  
 Separation of gas mixtures by centrifugation  
 ARC-10449 B72-10270 03  
 Alternating current losses in superconducting coils  
 M-FS-21129 B72-10360 03  
 A manually set magnetic wire counter  
 AEC-10039 B72-10369 01  
 Two-stage magnetometer measures weak magnetic fields  
 AEC-10068 B72-10370 01  
 High temperature permeameter for measuring magnetic properties  
 LEWIS-11609 B72-10443 03  
 Wide-range nuclear magnetic resonance detector  
 LEWIS-11513 B72-10478 03  
 Metastable atom probe for measuring electron beam density profiles  
 M-FS-21593 B72-10485 03  
 Magnetometer uses bismuth-selenide  
 LEWIS-11632 B72-10629 03

**MAGNETIC FLUX**

Pseudo-saturating power converter  
 NPO-11368 B72-10042 01  
 Low noise electromagnetic flowmeter  
 M-FS-21291 B72-10108 02  
 Ferrofluidic solenoid with axial and radial displacement  
 NPO-11738 B72-10241 06  
 Alternating current losses in superconducting coils  
 M-FS-21129 B72-10360 03  
 A brushless dc spin motor for momentum exchange altitude control  
 M-FS-14952 B72-10448 02  
 Current switch has built-in time delay: A concept  
 MSC-17324 B72-10453 01  
 Magnets with stabilized conductors  
 HQ-10727 B72-10465 03

**MAGNETIC INDUCTION**

Two-stage magnetometer measures weak magnetic fields  
AEC-10068 B72-10370 01

**MAGNETIC LENSES**

Mass separator for low velocity ions  
ARC-10375 B72-10123 03

**MAGNETIC MATERIALS**

Magnet-wire wrapping tool for integrated circuits  
NPO-11815 B72-10426 07  
Preparation of stable colloidal dispersions in fluorinated liquids  
HQ-10580 B72-10529 04

**MAGNETIC MEASUREMENT**

Improved laboratory gradiometer can be a field survey instrument  
MSC-13980 B72-10001 03  
Two-stage magnetometer measures weak magnetic fields  
AEC-10068 B72-10370 01

**MAGNETIC PERMEABILITY**

Two-stage magnetometer measures weak magnetic fields  
AEC-10068 B72-10370 01

**MAGNETIC PROBES**

Improved system for measuring speed of rotating machinery  
ARC-10413 B72-10179 07  
Magnetic circuitry mutual coupling probe  
M-FS-21664 B72-10535 02

**MAGNETIC PROPERTIES**

High temperature permeameter for measuring magnetic properties  
LEWIS-11609 B72-10443 03  
Magnets with stabilized conductors  
HQ-10727 B72-10465 03  
Preparation of stable colloidal dispersions in fluorinated liquids  
HQ-10580 B72-10529 04  
Analysis of circuits including magnetic cores (MTRAC)  
NPO-11494 B72-10724 02

**MAGNETIC RECORDING**

Technique minimizes the effects of dropouts on telemetry records  
NPO-11421 B72-10088 02

**MAGNETIC STORAGE**

A manually set magnetic wire counter  
AEC-10039 B72-10369 01  
Source deck compression and update program (CAPS)  
GSFC-11545 B72-10619 09

**MAGNETIC TAPES**

Video information system  
M-FS-21711 B72-10267 09  
Source deck compression and update program (CAPS)  
GSFC-11545 B72-10619 09

**MAGNETOHYDRODYNAMICS**

Pulsed high-power arc heater with improved cathode and triggering mechanism  
ARC-10173 B72-10048 03  
Separation of gas mixtures by centrifugation  
ARC-10449 B72-10270 03

**MAGNETOMETERS**

Improved laboratory gradiometer can be a field survey instrument  
MSC-13980 B72-10001 03  
Hexapole magnet field analysis  
GSFC-10995 B72-10113 03  
Glass technology involved in the manufacture of magnetometer components  
GSFC-11283 B72-10132 03

Two-stage magnetometer measures weak magnetic fields  
AEC-10068 B72-10370 01

Magnetometer uses bismuth-selenide  
LEWIS-11632 B72-10629 03

**MAGNETS**

Hexapole magnet field analysis  
GSFC-10995 B72-10113 03  
Overlay board for control consoles  
ARC-10007 B72-10191 02  
A magnetic mouse activity meter  
HQ-10664 B72-10482 05

**MAGNIFICATION**

Optical alignment of electrodes on electrical discharge machines  
XAC-09489 B72-10036 07  
Bileaf mechanical strain gage  
ARC-10303 B72-10197 07  
Slitting flat conductor cables with the single cutting edge slitter  
M-FS-20111 B72-10575 07

**MAINTENANCE**

Positive fast sealing union connections  
LEWIS-11290 B72-10133 06

**MAN MACHINE SYSTEMS**

Dc motor proportional control system for orthotic devices  
M-FS-21573 B72-10617 05  
A proposed remote manipulator system: A concept  
MSC-14245 B72-10733 06

**MANAGEMENT METHODS**

Manufacturing contamination prevention handbook  
M-FS-19113 B72-10394 08  
Program for creating an operating system generation cross reference index (SGINDEX)  
GSFC-11612 B72-10650 09

**MANAGEMENT PLANNING**

Technical management techniques for identification and control of industrial safety and pollution hazards  
M-FS-21883 B72-10588 05  
System/360 Computer Assisted Network Scheduling (CANS) System  
GSFC-10909 B72-10599 09  
FORTRAN manpower account program  
NPO-11973 B72-10623 09

**MANAGEMENT SYSTEMS**

Reliability analysis based on operational success criteria  
ARC-10490 B72-10214 09

**MANDRELS**

Convuluted fabric for full-pressure gloves  
ARC-10529 B72-10215 04  
Fabrication of uniaxial filament-reinforced epoxy tubes for structural application  
LANGLEY-10203 B72-10340 04  
New compression molding process of thermosetting plastic compounds  
LANGLEY-10782 B72-10356 08

**MANGANESE**

Manganese bismuth thin film for large capacity digital memories  
M-FS-21246 B72-10107 03  
Advanced infrared photomultiplier  
M-FS-20941 B72-10152 03

**MANIFOLDS**

Dispersion ring reduces injector orifice-to-orifice flow variation  
MSC-15953 B72-10117 07  
Interconnections for fluidic circuits  
ARC-10481 B72-10164 02

Experimental study of flow distribution with circumferential manifolds  
LEWIS-11649 B72-10738 06

**MANIPULATORS**

A proposed remote manipulator system: A concept  
MSC-14245 B72-10733 06

**MANNED SPACE FLIGHT NETWORK**

Deep space network  
NPO-11562 B72-10043 01  
System/360 Computer Assisted Network Scheduling (CANS) System  
GSFC-10909 B72-10599 09

**MANNED SPACECRAFT**

Airlock caution and warning system  
M-FS-21576 B72-10467 02

**MANUAL CONTROL**

Overlay board for control consoles  
ARC-10007 B72-10191 02

**MANUALS**

Standard environmental testing practices  
NPO-11567 B72-10101 02  
The design of an automated verification of redundant systems  
KSC-10702 B72-10295 02  
Radiological control manual  
M-FS-22092 B72-10460 03  
Phase-change materials handbook  
M-FS-22064 B72-10464 04  
A linear programming manual  
HQ-10743 B72-10671 09

**MANUFACTURING**

Packaging concept for LSI beam lead integrated circuits  
M-FS-21374 B72-10329 07  
Manufacturing contamination prevention handbook  
M-FS-19113 B72-10394 08  
Dual field alignment display and control for electron micropattern generator  
M-FS-22118 B72-10646 01

**MAPS**

Analog table look-up device identifies unknown terrain  
MSC-13816 B72-10033 03  
Hydraulic modeling of heat dispersion in large lakes  
AEC-10003 B72-10039 03  
Program to produce horizontal stereographic print maps from Nimbus HRIR data  
GSFC-11397 B72-10606 09

**MARINER PROGRAM**

Squib-operated disconnect  
NPO-11330 B72-10713 06

**MARS LANDING**

Particle detection by a light-scattering technique  
ARC-10384 B72-10160 03

**MARS PROBES**

Squib-operated disconnect  
NPO-11330 B72-10713 06

**MARS SURFACE**

Sheet plastic filters for solar cells  
NPO-11464 B72-10090 04

**MASKING**

Sputter etching of hemispherical bearings  
HQ-10712 B72-10534 08  
Improved photoetching fabrication method  
LEWIS-11268 B72-10745 08

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Prolate spheroidal slosh model for fluid motion  
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- MICROPARTICLES**  
Analysis of microsize particulates  
ARC-10647 B72-10565 04
- MICROPHONES**  
Position indicating, rotating boom  
LANGLEY-11202 B72-10395 07  
Blood pressure measurement and display system  
MSC-13036 B72-10334 05
- MICROPROGRAMMING**  
Flexible desk top computers using Large Scale Integration (LSI) chips  
M-FS-21277 B72-10112 01
- MICROROCKET ENGINES**  
Final report on a study of low-density nozzle flows, with application to microthrust rockets  
HQ-10761 B72-10748 06
- MICROSCOPES**  
Time-lapse camera for microscopy  
ARC-10423 B72-10125 05
- MICROSCOPY**  
Hand-held photomicroscopy system  
ARC-10468 B72-10190 03  
Silver stain for electron microscopy  
ARC-10661 B72-10415 05
- MICROSTRUCTURE**  
High strength alloy for immediate temperature, 24 to 704 C (75 to 1300 F), applications  
LEWIS-11634 B72-10344 04  
Advanced alloy design technique: High temperature cobalt base superalloy  
LEWIS-10436 B72-10514 04  
Joining porous components to solid metal structures  
LEWIS-11259 B72-10754 08
- MICROTHRUST**  
Final report on a study of low-density nozzle flows, with application to microthrust rockets  
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- MICROWAVE CIRCUITS**  
Technique for refocusing, decompressing, and conditioning spent electron beams  
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- MICROWAVE EMISSION**  
Technique for refocusing, decompressing, and conditioning spent electron beams  
LEWIS-11617 B72-10727 03
- MICROWAVE EQUIPMENT**  
The thin film microwave iris  
LANGLEY-10511 B72-10548 02  
Design of microstrip components by computer  
LANGLEY-11210 B72-10741 01
- MICROWAVE FREQUENCIES**  
Properties of ionization breakdown of air at microwave frequencies and optimization of component dimensions for maximum microwave power  
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- The thin film microwave iris  
**LANGLEY-10511** B72-10548 02  
 New pulsing technique may improve radar ranging systems  
**ARC-10600** B72-10564 02  
 Technique for refocusing, decompressing, and conditioning spent electron beams  
**LEWIS-11617** B72-10727 03
- MICROWAVE RESONANCE**  
 New pulsing technique may improve radar ranging systems  
**ARC-10600** B72-10564 02
- MICROWAVE SWITCHING**  
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**GSFC-11051** B72-10462 01
- MICROWAVE TUBES**  
 High efficiency collector for microwave tubes  
**LEWIS-11192** B72-10259 03
- MIGRATION**  
 Preventing oil migration in vacuum systems  
**GSFC-11253** B72-10129 04
- MILLING (MACHINING)**  
 Twistable mold for helicopter blades  
**ARC-10682** B72-10432 08
- MINERALOGY**  
 Improved laboratory gradiometer can be a field survey instrument  
**MSC-13980** B72-10001 03  
 Gravitational gradiometer measures mass changes  
**M-FS-20814** B72-10140 03
- MINIATURE ELECTRONIC EQUIPMENT**  
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**ARC-10274** B72-10053 03  
 Narrowband, crystal-controlled biomedical telemetry system  
**ARC-10708** B72-10255 01  
 Miniature intermittent contact switch  
**ARC-10450** B72-10271 01  
 An ingestible temperature-transmitter  
**ARC-10583** B72-10275 01  
 Nonsteady flow-direction measurement  
**LEWIS-11499** B72-10403 06
- MIRRORS**  
 Conical electromagnetic radiation flux concentrator  
**M-FS-21613** B72-10147 03  
 Particle detection by a light-scattering technique  
**ARC-10384** B72-10160 03  
 Cine recording ophthalmoscope  
**ARC-10399** B72-10189 05  
 Solar sensor with autocollimator  
**ARC-10148** B72-10192 03  
 Bileaf mechanical strain gage  
**ARC-10303** B72-10197 07  
 Sensitive holographic detection of small aerodynamic perturbations  
**ARC-10422** B72-10209 03  
 Liquid-helium-cooled Michelson interferometer  
**ARC-10554** B72-10217 03  
 Scanning technique for tracking small eye-movements  
**ARC-10488** B72-10220 05  
 Laser frequency modulation with electron plasma  
**AEC-10079** B72-10373 03  
 An improved apochromatic wedge utilizing optical molecular contact bonding  
**GSFC-11082** B72-10388 03
- A new low-cost method for producing collimating mirrors  
**LEWIS-11553** B72-10513 08  
 Particle detection with intensified laser beam  
**HQ-10645** B72-10516 03  
 An absorption spectrum amplifier for determining gas composition  
**HQ-10752** B72-10524 03  
 Improved transmittance measurement with a magnesium oxide coated integrating sphere  
**LEWIS-11840** B72-10717 04
- MIS (SEMICONDUCTORS)**  
 A voltage-tunable three-terminal Gunn device  
**HQ-10783** B72-10518 01  
 Development of chip passivated monolithic complementary MISFET circuits with beam leads  
**M-FS-22264** B72-10696 01
- MISSILE CONFIGURATIONS**  
 Mislift and miss-drag programs  
**LANGLEY-10932** B72-10153 09
- MISSILE DESIGN**  
 Mislift and miss-drag programs  
**LANGLEY-10932** B72-10153 09
- MISSION PLANNING**  
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**GSFC-10909** B72-10599 09
- MIXING CIRCUITS**  
 Signal to noise measurement circuit  
**GSFC-11239** B72-10102 01
- MOBILITY**  
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**LANGLEY-11069** B72-10395 05  
 Proposed semiconductor film improvement  
**HQ-10685** B72-10438 04  
 Triangular wheel locomotion mechanism  
**NPO-11366** B72-10714 06
- MODELS**  
 Urban air pollution dispersion model  
**AEC-10004** B72-10003 03  
 Hydraulic modeling of heat dispersion in large lakes  
**AEC-10003** B72-10039 03
- MODULATION**  
 Accurate measurement of telemetry performance  
**NPO-11457** B72-10089 02  
 Vortex servovalve for fluidic or electrical input  
**ARC-10155** B72-10173 07  
 Nondispersive infrared analyzer for specific gases in complex mixtures  
**ARC-10308** B72-10198 03
- MODULES**  
 Interconnections for fluidic circuits  
**ARC-10481** B72-10164 02
- MODULUS OF ELASTICITY**  
 Beryllium thin films for resistor applications  
**ARC-10485** B72-10021 01  
 Titanium reinforced boron polyimide composite  
**M-FS-21916** B72-10353 04  
 High strength high modulus ceramic fiber  
**M-FS-21266** B72-10592 04  
 A monostrain test apparatus  
**M-FS-24221** B72-10679 06
- MOISTURE CONTENT**  
 Remote measurement of the water content of snowpacks  
**ARC-10651** B72-10567 03  
 Effect of the method of process on the control of microbial growth by water activity in foods  
**MSC-14234** B72-10732 05
- MOLDING MATERIALS**  
 New polyimide polymer has excellent processing characteristics with improved thermo-oxidative and hydrolytic stabilities  
**LEWIS-11323** B72-10175 04  
 High strength, medium density molded foam  
**AEC-10053** B72-10235 04  
 New compression molding process of thermosetting plastic compounds  
**LANGLEY-1078** B72-10356 08
- MOLDS**  
 Twistable mold for helicopter blades  
**ARC-10682** B72-10432 08
- MOLECULAR CHAINS**  
 Process for synthesizing and formulating condensed ring polymers  
**LANGLEY-10423** B72-10473 04
- MOLECULAR FLOW**  
 Sonic limitations and startup problems of heat pipes  
**AEC-10036** B72-10368 03
- MOLECULAR STRUCTURE**  
 Low-void polyimide resins for autoclave processing  
**LEWIS-11665** B72-10728 04
- MOLECULAR WEIGHT**  
 Continuous monitor for gas ratios in a mixture  
**LEWIS-11095** B72-10229 05  
 Separation of gas mixtures by centrifugation  
**ARC-10449** B72-10270 03  
 Process for synthesizing and formulating condensed ring polymers  
**LANGLEY-10423** B72-10473 04
- MOLECULES**  
 Erasable holographic medium using cis-trans isomerization  
**M-FS-22062** B72-10720 03
- MOLTEN SALT ELECTROLYTES**  
 Al/C12 molten salt battery  
**HQ-10696** B72-10527 01
- MOLYBDENUM**  
 High voltage electrical insulation coating for refractory materials  
**LEWIS-11479** B72-10290 04
- MOLYBDENUM ALLOYS**  
 Common bearing material has highest fatigue life at moderate temperature  
**LEWIS-11592** B72-10382 04
- MOLYBDENUM DISULFIDES**  
 Inorganic glass ceramic slip rings  
**M-FS-20711** B72-10313 04  
 Research on bearing lubricants for use in a high vacuum  
**M-FS-22119** B72-10469 04
- MOLYBDENUM OXIDES**  
 Acousto-optic filter for electronic laser tuning  
**HQ-10715** B72-10520 03
- MOMENTUM**  
 Program for calculating laminar and turbulent boundary layers in arbitrary pressure gradients  
**LEWIS-11097** B72-10111 09



## MONITORS

- Software control for large scale on-board checkout: A concept  
 MSC-13977 B72-10015 09  
 Remote sensing X-ray spectrometer  
 MSC-13978 B72-10016 03  
 Control of acceleration in sine/random vibration tests  
 NPO-11482 B72-10091 02  
 Solar sensor with autocollimator  
 ARC-10148 B72-10192 03  
 Simple dynamic electromagnetic radiation detector  
 LEWIS-11159 B72-10227 03  
 Filter cassette for high volume air sampler  
 LEWIS-11469 B72-10379 03  
 Roll function in a flight simulator  
 ARC-10557 B72-10417 02  
 Acoustic emission used as weld quality monitor  
 AEC-10018 B72-10427 08  
 An absentee monitoring device  
 KSC-10668 B72-10578 01  
 Acoustical analysis system  
 GSFC-11087 B72-10751 02
- MONOCHROMATIZATION**  
 Optical device for producing color line scan display from monochrome oscilloscope traces  
 LANGLEY-10896 B72-10375 03
- MONOCHROMATORS**  
 Rotary shutter mechanism contains optical elements  
 GSFC-11244 B72-10387 03  
 An improved apochromatic wedge utilizing optical molecular contact bonding  
 GSFC-11082 B72-10388 03  
 Helium window for shock-tube monochromators  
 NPO-11852 B72-10556 03
- MONOMERS**  
 Polymeric coatings using electronic excitation  
 HQ-10698 B72-10257 04  
 Free-radical solution-polymerization of trifluoronitrosomethane with tetrafluoroethylene  
 ARC-10567 B72-10419 04
- MONOPROPELLANTS**  
 Propellant-powered actuator for gas generators  
 ARC-10484 B72-10008 03  
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 NPO-12004 B72-10502 06
- MORPHOLOGY**  
 Plasma calcining of pigment particles for thermal control coatings  
 M-FS-21267 B72-10320 04
- MOSAICS**  
 Piezoelectric transducer mosaic  
 ARC-10509 B72-10014 01  
 Solid state television camera has no imaging tube  
 M-FS-21553 B72-10254 02
- MOTION PICTURES**  
 Cine recording ophthalmoscope  
 ARC-10399 B72-10189 05  
 Hand-held photomicroscopy system  
 ARC-10468 B72-10190 03
- MOTORS**  
 Graph for locked rotor current  
 MSC-15703 B72-10075 06
- MOUNTING**  
 Solar sensor with autocollimator  
 ARC-10148 B72-10192 03

- Quick-donning backpack harness  
 LANGLEY-10102 B72-10641 05
- MTBF**  
 Mathematical techniques for estimating operational readiness of complex systems  
 MSC-17694 B72-10335 09
- MULTILAYER INSULATION**  
 Method of determining thermal conductivity in multi-layer insulation systems  
 M-FS-20213 B72-10154 03  
 Superior cryogenic insulation developed  
 M-FS-21560 B72-10187 04  
 Insulating effectiveness of self-spacing dimpled foil  
 LEWIS-10941 B72-10406 04  
 Flexible thermal device  
 M-FS-21630 B72-10612 04
- MULTIPLE OUTPUT PROGRAMS**  
 Topological solution of bilateral switching networks  
 ARC-10294 B72-10055 01
- MULTIPLEXING**  
 Flexible desk top computers using Large Scale Integration (LSI) chips  
 M-FS-21277 B72-10112 01  
 Low distortion automatic phase control circuit  
 M-FS-21671 B72-10682 02  
 Insulated-gate field-effect transistor strain sensor  
 LANGLEY-11012 B72-10731 01
- MULTIPROGRAMMING**  
 Integrated multi-path program analysis and cost technique (IMPACT)  
 M-FS-21880 B72-10676 09
- MULTISPECTRAL BAND SCANNERS**  
 Analog table look-up device identifies unknown terrain  
 MSC-13816 B72-10033 03
- MULTIVIBRATORS**  
 High noise immunity one shot  
 ARC-10137 B72-10047 01  
 Crystal-controlled multivibrator  
 NPO-11627 B72-10155 01  
 An ingestible temperature-transmitter  
 ARC-10583 B72-10275 01
- MYLAR (TRADEMARK)**  
 Lightweight, broad-band spectrum analyzer  
 ARC-10405 B72-10060 01  
 Method of determining thermal conductivity in multi-layer insulation systems  
 M-FS-20213 B72-10154 03  
 Superior cryogenic insulation developed  
 M-FS-21560 B72-10187 04  
 Liquid-helium-cooled Michelson interferometer  
 ARC-10554 B72-10217 03  
 Improved high-performance shock tube  
 NPO-11885 B72-10242 03  
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 M-FS-21926 B72-10698 05

## N

## N-P-N JUNCTIONS

- Overlap diffusion for increasing phototransistor dynamic range  
 M-FS-20407 B72-10347 01  
 Gate protective device for SOS array  
 HQ-10745 B72-10755 01

## NATURAL GAS

- Computer program for natural gas flow through nozzles  
 LEWIS-11534 B72-10362 09
- NAVIGATION**  
 Software control for large scale on-board checkout: A concept  
 MSC-13977 B72-10015 09
- NAVIGATION AIDS**  
 A simple dead-reckoning navigational system  
 M-FS-21165 B72-10409 02
- NEAR INFRARED RADIATION**  
 Enhanced Lamb dip for absolute laser frequency stabilization  
 HQ-10695 B72-10481 02
- NEON**  
 New reaction tester accurate within 56 microseconds  
 MSC-13604 B72-10031 05  
 A sensitive image intensifier which uses inert gas  
 LRL-10024 B72-10312 03
- NETWORK ANALYSIS**  
 Standardization and qualification of computer programs for circuit design  
 M-FS-21537 B72-10142 09
- NEUROLOGY**  
 New reaction tester accurate within 56 microseconds  
 MSC-13604 B72-10031 05
- NEUTRON ABSORBERS**  
 Boron-10 loaded inorganic shielding material  
 M-FS-22280 B72-10740 04
- NEUTRON BEAMS**  
 Simple dynamic electromagnetic radiation detector  
 LEWIS-11159 B72-10227 03
- NEUTRON DIFFRACTION**  
 A liquid radiation detector with high spatial resolution  
 MSC-13965 B72-10034 03
- NEUTRONS**  
 Neutron radiographic viewing system  
 M-FS-22024 B72-10468 02  
 Boron-10 loaded inorganic shielding material  
 M-FS-22280 B72-10740 04
- NEWTONIAN FLUIDS**  
 Parallel-plate viscometer  
 NPO-11387 B72-10700 03
- NICKEL**  
 Wide-range dynamic pressure sensor  
 ARC-10263 B72-10196 03  
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 LEWIS-10965 B72-10456 04
- NICKEL ALLOYS**  
 Bonding titanium to Rene 41 alloy  
 ARC-10311 B72-10041 08  
 Advanced protective coating for superalloys  
 LEWIS-11473 B72-10150 04  
 A protective coating for stainless steel  
 LEWIS-11267 B72-10256 04  
 Joining precipitation-hardened nickel-base alloys by friction welding  
 LEWIS-11514 B72-10288 08  
 High strength alloy for immediate temperature, 24 to 704 C (75 to 1300 F), applications  
 LEWIS-11634 B72-10344 04  
 Advanced alloy design technique: High temperature cobalt base superalloy  
 LEWIS-10436 B72-10514 04  
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 LANGLEY-10801 B72-10744 08

Improved photoetching fabrication method  
LEWIS-11268 B72-10745 08

**NICKEL OXIDES**  
Electrodes for sealed secondary batteries  
ARC-10238 B72-10050 02

**NICKEL PLATE**  
Sputter etching of hemispherical bearings  
HQ-10712 B72-10534 08

**NIMBUS SATELLITES**  
Program to produce horizontal stereographic print maps from Nimbus HRIR data  
GSFC-11397 B72-10606 09

**NIOBIUM**  
New twisted intermetallic compound superconductor: A concept  
LEWIS-11015 B72-10282 04

**NIOBIUM ALLOYS**  
Insulating effectiveness of self-spacing dimpled foil  
LEWIS-10941 B72-10406 04

**NIOBIUM COMPOUNDS**  
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M-FS-21129 B72-10360 03  
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HQ-10727 B72-10465 03

**NITRATES**  
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ARC-10661 B72-10415 05

**NITRIC ACID**  
Covalent bonding of antibodies of polystyrene latex beads: A concept  
MSC-13906 B72-10006 05

**NITROGEN**  
Pulsed high-power arc heater with improved cathode and triggering mechanism  
ARC-10173 B72-10048 03  
Glass technology involved in the manufacture of magnetometer components  
GSFC-11283 B72-10132 03  
Aircrew oxygen system  
ARC-10247 B72-10195 05  
Diatomic infrared gasdynamic laser permits selection of wavelengths  
ARC-10370 B72-10206 03  
Simple gas chromatographic system for analysis of microbial respiratory gases  
ARC-10403 B72-10207 03  
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ARC-10248 B72-10219 05  
Oxygen carrier for gas chromatographic analysis of inert gases in propellants  
ARC-10574 B72-10249 04  
Small turbine-type flowmeters for liquid hydrogen  
LEWIS-11535 B72-10331 06  
Nonflammable potting, encapsulating and/or conformal coating compound  
MSC-13499 B72-10337 04  
Evaluating foam heterogeneity  
AEC-10046 B72-10365 04  
Proposed semiconductor film improvement  
HQ-10685 B72-10438 04  
Temperature control of a cryogenic bath  
HQ-10788 B72-10532 03  
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KSC-10304 B72-10540 06

**NITROGEN COMPOUNDS**  
Titanium alloy stress corrosion cracking in presence of dinitrogen tetroxide  
M-FS-21113 B72-10321 04

**NITROGEN OXIDES**  
Fluidized-bed combustion reduces atmospheric pollutants  
AEC-10085 B72-10431 04

**NITROGEN POLYMERS**  
Functionally terminated liquid nitroso fluorocarbon terpolymers  
M-FS-21539 B72-10493 04

**NITROGEN TETROXIDE**  
Leaching of nitroso rubber material removes uncured polymer  
MSC-17185 B72-10449 04

**NITROSO COMPOUNDS**  
Leaching of nitroso rubber material removes uncured polymer  
MSC-17185 B72-10449 04

**NOBLE METALS**  
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LEWIS-11471 B72-10176 01  
High-temperature ceramic-to-ceramic seals  
ARC-10319 B72-10199 04  
Research on bearing lubricants for use in a high vacuum  
M-FS-22119 B72-10469 04

**NOISE (SOUND)**  
Loudness (annoyance), prediction procedure for steady sounds  
LEWIS-11761 B72-10579 05

**NOISE GENERATORS**  
Evaluation of jet engine noise  
M-FS-21416 B72-10263 03

**NOISE INTENSITY**  
Acoustic spectral analysis and testing techniques  
NPO-11554 B72-10341 03

**NOISE REDUCTION**  
Reduction of fan noise: A concept  
ARC-10312 B72-10040 06  
Evaluation of jet engine noise  
M-FS-21416 B72-10263 03  
Reduction of noise in gyro outputs  
NPO-11603 B72-10743 06

**NONDESTRUCTIVE TESTS**  
Method of determining thermal conductivity in multi-layer insulation systems  
M-FS-20213 B72-10154 03  
Nondestructive-test standards for evaluation of fiber-reinforced composites  
M-FS-21288 B72-10157 04  
Nondestructive testing of microtab welds  
ARC-10176 B72-10296 02  
Simple non-destructive tests for electroexplosive devices  
NPO-11563 B72-10315 01  
Composite mobile system for holographic nondestructive testing  
M-FS-21704 B72-10351 03  
Nondestructive testing for braze voids in thin panels by use of special coatings  
LANGLEY-10486 B72-10374 08  
Deflection resistance indicator  
M-FS-24010 B72-10401 04  
Acoustic emission used as weld quality monitor  
AEC-10018 B72-10427 08  
Neutron radiographic viewing system  
M-FS-22024 B72-10468 02  
Magnetic circuitry mutual coupling probe  
M-FS-21664 B72-10535 02

Analysis of microsize particulates  
ARC-10647 B72-10565 04  
Spark ultrasonic transducer  
M-FS-21233 B72-10594 04

**NONFLAMMABLE MATERIALS**  
Halogenation of microcapsule walls  
ARC-10410 B72-10161 04  
Nonflammable potting, encapsulating and/or conformal coating compound  
MSC-13499 B72-10337 04

**NONLINEAR EQUATIONS**  
Algorithm for Liapunov stability analysis  
ARC-10498 B72-10023 09  
Carbon monoxide oxidation rates computed for automobile thermal reactor conditions  
LEWIS-11638 B72-10137 04  
Computer program for calculation of complex chemical equilibrium compositions  
LEWIS-11714 B72-10718 09

**NONLINEAR FILTERS**  
High voltage protection network  
ARC-10197 B72-10119 02

**NONLINEAR SYSTEMS**  
Algorithm for Liapunov stability analysis  
ARC-10498 B72-10023 09

**NONLINEARITY**  
Electronic switching circuit uses complementary non-linear components  
AEC-10060 B72-10236 01

**NORMAL DENSITY FUNCTIONS**  
Device for measuring electric fields  
ARC-10164 B72-10148 03  
A study of the power spectral density of an FM signal  
M-FS-21070 B72-10361 02

**NOSE CONES**  
Water impact loads  
M-FS-21955 B72-10621 09

**NOZZLE DESIGN**  
Ejector nozzle with massive blowing  
ARC-10621 B72-10693 06

**NOZZLE FLOW**  
Design of two-dimensional sharp-edged-throat supersonic nozzle with boundary-layer correction  
LEWIS-11636 B72-10070 09  
Wide angle solar sensor  
NPO-11341 B72-10080 01  
Computer program for natural gas flow through nozzles  
LEWIS-11534 B72-10362 09  
Air assist fuel nozzle reduces aircraft gas turbine engine emissions at idle operation  
LEWIS-11512 B72-10434 07  
Ejector nozzle with massive blowing  
ARC-10621 B72-10693 06

**NOZZLE GEOMETRY**  
Design of two-dimensional sharp-edged-throat supersonic nozzle with boundary-layer correction  
LEWIS-11636 B72-10070 09

**NOZZLES**  
Dynamic valve to supply constant total thrust to two orifice jets  
ARC-10239 B72-10120 07

**NUCLEAR MAGNETIC RESONANCE**  
Wide-range nuclear magnetic resonance detector  
LEWIS-11513 B72-10478 03

## NUCLEAR POWER PLANTS

Computer program for afterheat temperature distribution for mobile nuclear power plant

LEWIS-11693 B72-10634 09

## NUCLEAR REACTORS

Simple dynamic electromagnetic radiation detector

LEWIS-11159 B72-10227 03

## NUCLEATION

Nonmetallic impurities improve mechanical properties of vapor-deposited tungsten

LEWIS-10800 B72-10454 04

## NUMERICAL ANALYSIS

Prediction of ducted fan performance

ARC-10615 B72-10064 09

Selecting digital filters

M-FS-20933 B72-10156 01

Flow equation for porous plug and capillary tube flow restrictors

GSFC-11387 B72-10289 06

Sunspot analysis and prediction

M-FS-21724 B72-10317 03

Mathematical techniques for estimating operational readiness of complex systems

MSC-17694 B72-10335 09

Cavitation data for hydraulic equipment

LEWIS-11642 B72-10384 07

Variable boundary II heat conduction

LEWIS-10679 B72-10444 09

Equations to assess the impact resistance of fiber composites

LEWIS-11486 B72-10503 04

High speed sequential decoder

ARC-10657 B72-10568 09

Study of hot hardness characteristics of tool steels

LEWIS-11785 B72-10583 04

Thermal conductivity and electrical resistivity of porous materials

LEWIS-11754 B72-10587 04

Significance arithmetic experimental package (SIGPAC)

GSFC-11499 B72-10600 09

Computer program analyzes and monitors electrical power systems (POSIMO)

GSFC-11505 B72-10610 09

Spectral analysis of multiple time series

M-FS-18859 B72-10614 09

Method for nonlinear exponential regression analysis

M-FS-21965 B72-10622 09

Numerical solution of potential flow problems in terms of flux components

M-FS-21751 B72-10667 09

Mathematical analysis for the performance assessment of space communication parameters, IBM-360 version

GSFC-11523 B72-10675 09

Analysis of circuits including magnetic cores (MTRAC)

NPO-11494 B72-10724 02

## NUMERICAL INTEGRATION

Errors in hybrid computers

M-FS-21289 B72-10141 02

## NUTS (FASTENERS)

Specimen for high-temperature tensile tests

ARC-10531 B72-10028 04

Micro regulating ball valve

ARC-10295 B72-10121 06

Positive fast sealing union connections

LEWIS-11290 B72-10133 06

Perload indicating turnbuckle

M-FS-21488 B72-10355 07

## NYLON (TRADEMARK)

Method of determining thermal conductivity in multi-layer insulation systems

M-FS-20213 B72-10154 03

Superior cryogenic insulation developed

M-FS-21560 B72-10187 04

## O

## O RING SEALS

Improved elastomer for use with oxygen difluoride

ARC-10528 B72-10027 04

High speed, self-acting, face-contact shaft seal has low leakage and very low wear

LEWIS-11598 B72-10114 07

Positive fast sealing union connections

LEWIS-11290 B72-10133 06

Fill and vent quick disconnect

M-FS-21822 B72-10645 07

Squib-operated disconnect

NPO-11330 B72-10713 06

## OAO

Algorithm for Liapunov stability analysis

ARC-10498 B72-10023 09

## OFF-ON CONTROL

Adaptive position control loop

ARC-10255 B72-10052 02

## OILS

Preventing oil migration in vacuum systems

GSFC-11253 B72-10129 04

Efficient baffle prevents oil backstreaming in diffusion pumps

LRL-10025 B72-10475 07

Improved method for reclaiming vacuum diffusion pump oil

LEWIS-11647 B72-10511 04

Preparation of stable colloidal dispersions in fluorinated liquids

HQ-10580 B72-10529 04

## OPACITY

Nematic liquid crystals for optical shutters: A concept

NPO-11367 B72-10083 03

## OPERATING TEMPERATURE

Common bearing material has highest fatigue life at moderate temperature

LEWIS-11592 B72-10382 04

## OPERATIONS RESEARCH

Mathematical techniques for estimating operational readiness of complex systems

MSC-17694 B72-10335 09

## OPERATOR PERFORMANCE

Restraint and locomotion aid

ARC-10153 B72-10558 06

## OPTICAL COMMUNICATION

Transmission of optical frequencies with minimal losses

HQ-10541 B72-10389 03

Efficient wire-grid duplexer-polarized for CO<sub>2</sub> lasers

GSFC-11403 B72-10440 03

## OPTICAL EQUIPMENT

Optical alignment of electrodes on electrical discharge machines

XAC-09489 B72-10036 07

Nematic liquid crystals for optical shutters: A concept

NPO-11367 B72-10083 03

Optical shutter for use in shock tubes

ARC-10516 B72-10128 03

Annular objective apertures improve resolution of electron microscopes

ARC-10448 B72-10171 03

A dual-beam actinic light source for photosynthesis research

ARC-10351 B72-10205 05

Optical enhancement of sensitivity in laser Doppler velocity systems

ARC-10653 B72-10310 03

Rotary shutter mechanism contains optical elements

GSFC-11244 B72-10387 03

Roll function in a flight simulator

ARC-10557 B72-10417 02

Fabrication of carbon film composites for high-strength structures

ARC-10613 B72-10423 04

Neutron radiographic viewing system

M-FS-22024 B72-10468 02

Particle detection with intensified laser beam

HQ-10645 B72-10516 03

Assessment of water pollution by airborne measurement of chlorophyll

ARC-10648 B72-10566 04

Oscillation of laser-beam intensity as observed with beam splitters

ARC-10694 B72-10572 03

Slitting flat conductor cables with the single cutting edge slitter

M-FS-20111 B72-10575 07

A transmitting and reflecting diffuser for ultraviolet light

LANGLEY-10385 B72-10611 03

Self-calibrating remote atmospheric electromagnetic probe and data acquisition system

M-FS-21212 B72-10665 03

Two-speed deflection system for electron micropattern generator

M-FS-22117 B72-10668 02

An optical quality meter suitable for cryogenic liquids

LEWIS-11814 B72-10686 06

## OPTICAL FILTERS

Solar experiment alignment system

ARC-10471 B72-10020 03

Acousto-optic filter for electronic laser tuning

HQ-10715 B72-10520 03

Improved optical filters for automated visual inspection

HQ-10720 B72-10521 03

## OPTICAL HETERODYNING

Optical enhancement of sensitivity in laser Doppler velocity systems

ARC-10653 B72-10310 03

## OPTICAL MICROSCOPES

Alignment microscope for rotating laser scanner

MSC-14118 B72-10435 03

## OPTICAL PATHS

Rotary shutter mechanism contains optical elements

GSFC-11244 B72-10387 03

## OPTICAL POLARIZATION

Efficient wire-grid duplexer-polarized for CO<sub>2</sub> lasers

GSFC-11403 B72-10440 03

## OPTICAL PROPERTIES

- Performance of silicon solar cell assemblies  
NPO-11847 B72-10186 01  
A sensitive image intensifier which uses inert gas  
LRL-10024 B72-10312 03  
Transmission of optical frequencies with minimal losses  
HQ-10541 B72-10389 03  
A transmitting and reflecting diffuser for ultraviolet light  
LANGLEY-10385 B72-10611 03  
A bi-stable optical device  
HQ-10701 B72-10655 03  
Parallel-plate viscometer  
NPO-11387 B72-10700 03  
Improved zinc oxide thermal control coatings  
NPO-11139 B72-10711 04

## OPTICAL THICKNESS

- Unsupported thin film beam splitter  
GSFC-10525 B72-10471 02

## OPTICAL TRACKING

- Atmospheric density variations related to internal gravity waves  
M-FS-21637 B72-10143 03

## OPTICS

- Cine recording ophthalmoscope  
ARC-10399 B72-10189 05  
Hand-held photomicroscopy system  
ARC-10468 B72-10190 03  
Projections of scan patterns on human retina  
ARC-10181 B72-10193 05

## OPTIMIZATION

- Optimization technique for problems with an inequality constraint  
ARC-10522 B72-10222 09  
Properties of ionization breakdown of air at microwave frequencies and optimization of component dimensions for maximum microwave power  
M-FS-21924 B72-10316 01  
Design criteria monograph on turbopump inducers  
LEWIS-11824 B72-10635 08  
An approach to real-time process control of semiconductor wire-bonding  
M-FS-21558 B72-10644 08  
Optimization of fluid line sizes with pumping power penalty IBM-360 computer program  
MSC-17930 B72-10722 06  
Optimizing designs of two-level factorial experiments given partial prior information (NAMER)  
LEWIS-11708 B72-10726 09

## ORGANIC CHEMISTRY

- Improved thermally conducting electron transfer polymers  
GSFC-11304 B72-10291 04  
Polyimide foams provide thermal insulation and fire protection  
ARC-10464 B72-10300 04  
Synthesis of temperature and solvent-resistant polymers  
M-FS-20848 B72-10342 04  
Thermally resistant polymers for fuel tank sealants  
M-FS-21232 B72-10358 04  
Polymeric binder for explosives  
AEC-10062 B72-10366 04  
Bondability of RTV silicon rubber  
AEC-10026 B72-10367 04

- Chemical modification of poly(p-phenylene) for use in ablative compositions  
ARC-10135 B72-10451 04  
Process for synthesizing and formulating condensed ring polymers  
LANGLEY-10423 B72-10473 04

## ORGANIC COMPOUNDS

- A method of isolating organic compounds present in water  
AEC-10010 B72-10044 04  
Initiation of polymerization by tetrabutylammonium p-lithiophenoxide  
ARC-10553 B72-10223 04  
Improved thermally conducting electron transfer polymers  
GSFC-11304 B72-10291 04  
Polymeric binder for explosives  
AEC-10062 B72-10366 04  
Bondability of RTV silicon rubber  
AEC-10026 B72-10367 04

## ORGANIC MATERIALS

- Composite casting demonstration  
M-FS-21668 B72-10266 04  
Synthesis of temperature and solvent-resistant polymers  
M-FS-20848 B72-10342 04  
Purification of contaminated water by filtration through porous glass  
ARC-10655 B72-10412 04  
Nonflammable and abrasion resistant coating process for glass fibers  
MSC-14024 B72-10445 08

## ORGANOMETALLIC COMPOUNDS

- Proposed semiconductor film improvement  
HQ-10685 B72-10438 04

## ORGANS

- Improved ultrasonic biomedical measuring apparatus  
ARC-10597 B72-10695 05

## ORIFICE FLOW

- Dispersion ring reduces injector orifice-to-orifice flow variation  
MSC-15953 B72-10117 07

## ORIFICES

- Pressure sensitive gas flow meter  
ARC-10219 B72-10049 06  
Dynamic valve to supply constant total thrust to two orifice jets  
ARC-10239 B72-10120 07  
Micro regulating ball valve  
ARC-10295 B72-10121 06  
An economical vent cover  
M-FS-20692 B72-10348 07

## ORTHOGONAL FUNCTIONS

- Program for the transient response of ablating axisymmetric bodies including the effects of shape change  
LANGLEY-11049 B72-10068 09

## ORTHOGONALITY

- Optical bonding agents for severe environments  
ARC-10459 B72-10063 04

## ORTHOPEDICS

- Dc motor proportional control system for orthotic devices  
M-FS-21573 B72-10617 05

## ORTHOTROPIC CYLINDERS

- New compression molding process of thermosetting plastic compounds  
LANGLEY-10782 B72-10356 08

## ORTHOTROPISM

- Program for the transient response of ablating axisymmetric bodies including the effects of shape change  
LANGLEY-11049 B72-10068 09

## OSCILLATING FLOW

- Microresonator for damping flow oscillations  
M-FS-18401 B72-10105 06

## OSCILLATION DAMPERS

- Microresonator for damping flow oscillations  
M-FS-18401 B72-10105 06

## OSCILLATIONS

- Vibrating ribbon bolometer: A concept  
XAC-10768 B72-10170 03  
Nondispersive infrared analyzer for specific gases in complex mixtures  
ARC-10308 B72-10198 03  
Control of oscillations in a discharge circuit  
ARC-10556 B72-10304 01  
A voltage-tunable three-terminal Gunn device  
HQ-10783 B72-10518 01  
Thermal induced flow oscillations in heat exchangers for supercritical fluids  
M-FS-21262 B72-10598 06

## OSCILLATORS

- Implanted telemeter for electrocardiogram and body temperature  
XAC-08505 B72-10035 05  
Improved device measures performance of batteries under load  
ARC-10252 B72-10051 02  
Frequency switch keyed oscillator  
ARC-10412 B72-10124 01  
Heart simulator  
M-FS-21609 B72-10131 02  
Fluidic ignition detection  
M-FS-21498 B72-10158 06  
Continuous monitor for gas ratios in a mixture  
LEWIS-11095 B72-10229 05  
Very high speed direct-readout, control and recording system  
M-FS-20658 B72-10442 02  
Enhanced Lamb dip for absolute laser frequency stabilization  
HQ-10695 B72-10481 02  
A voltage-tunable three-terminal Gunn device  
HQ-10783 B72-10518 01  
A compact battery powered digital thermometer  
MSC-14084 B72-10545 02  
Remote measurement of the water content of snowpacks  
ARC-10651 B72-10567 03  
Oscillating hot-wire anemometer  
NPO-11634 B72-10609 02

## OSCILLOGRAPHS

- Parallel-plate viscometer  
NPO-11387 B72-10700 03

## OSCILLOSCOPES

- Analog table look-up device identifies unknown terrain  
MSC-13816 B72-10033 03  
Improved system for measuring speed of rotating machinery  
ARC-10413 B72-10179 07  
Simple non-destructive tests for electroexplosive devices  
NPO-11563 B72-10315 01  
Optical device for producing color line scan display from monochrome oscilloscope traces  
LANGLEY-10896 B72-10375 03  
Simple turbine balancing test apparatus  
LEWIS-11658 B72-10377 07

- Amplifier for signal from thin film transducer  
LEWIS-11494 B72-10463 01  
Wideband wattmeter for instant measurement of real power  
LEWIS-11698 B72-10737 01
- OSMOSIS**  
Water purification by reverse osmosis using heterocyclic polymer membranes  
LANGLEY-10514 B72-10230 04  
Stabilization of porous glass reverse-osmosis membranes  
ARC-10646 B72-10309 04  
Rapid evaluation of reverse-osmosis membranes  
ARC-10659 B72-10413 04  
Reverse-osmosis membranes by plasma polymerization  
ARC-10696 B72-10710 04
- OUTER PLANETS EXPLORERS**  
Radioisotope thermionic power supply for spacecraft  
ARC-10438 B72-10212 03
- OUTGASSING**  
Optical bonding agents for severe environments  
ARC-10459 B72-10063 04  
Laboratory leak tester provides high sensitivity  
AEC-10042 B72-10240 03  
Baffle to confine glow discharge in ion pump  
M-FS-21575 B72-10324 03
- OUTLETS**  
Cryogenic gel flow viscometer  
ARC-10523 B72-10180 03
- OUTPUT**  
Third order digital-to-analog converter  
MSC-12458 B72-10030 02  
A differential ECG amplifier with single-ended output  
ARC-10411 B72-10061 05  
Vidicon storage tube electrical input/output  
MSC-14053 B72-10285 02  
A manually set magnetic wire counter  
AEC-10039 B72-10369 01  
Universal dc signal conditioner  
MSC-17526 B72-10510 02  
An improved learning decoder  
MSC-14070 B72-10573 02
- OVERPRESSURE**  
Ferromagnetic-fluid logic devices  
ARC-10503 B72-10011 06
- OVERVOLTAGE**  
Photomultiplier blanking circuit  
ARC-10593 B72-10561 01
- OXIDATION**  
Carbon monoxide oxidation rates computed for automobile thermal reactor conditions  
LEWIS-11638 B72-10137 04  
Hydrogen eliminator  
ARC-10408 B72-10208 03  
Metabolic simulation chamber  
HQ-10776 B72-10658 05
- OXIDATION RESISTANCE**  
Advanced protective coating for superalloys  
LEWIS-11473 B72-10150 04  
New polyimide polymer has excellent processing characteristics with improved thermo-oxidative and hydrolytic stabilities  
LEWIS-11323 B72-10175 04  
A protective coating for stainless steel  
LEWIS-11267 B72-10256 04
- Dispersion-strengthened chromium alloy  
LEWIS-10982 B72-10378 04
- OXIDES**  
Oxygen-layer structure improves lithium-doped silicon solar cells  
NPO-11403 B72-10085 03  
Improved method for producing metal-reinforced ceramics  
AEC-10070 B72-10234 04  
Titanium alloy stress corrosion cracking in presence of dinitrogen tetroxide  
M-FS-21113 B72-10321 04  
High strength high modulus ceramic fiber  
M-FS-21266 B72-10592 04  
Boron-10 loaded inorganic shielding material  
M-FS-22280 B72-10740 04
- OXIDIZERS**  
Combination throttle and shutoff valve  
M-FS-21513 B72-10287 07  
Remote control flare stack igniter for combustible gases  
M-FS-21675 B72-10352 07  
Oxygen plasmas used to synthesize superoxides  
ARC-10686 B72-10570 04
- OXIMETRY**  
Ear oximeter-transducer monitors four physiological responses  
XAC-05422 B72-10224 05
- OXYGEN**  
Oxygen pressure control for electrolysis cells  
ARC-10250 B72-10074 02  
Oxygen-layer structure improves lithium-doped silicon solar cells  
NPO-11403 B72-10085 03  
Low temperature catalytic ignition of hydrogen and oxygen  
ARC-10492 B72-10127 03  
Fluidic ignition detection  
M-FS-21498 B72-10158 06  
Cell for electrolysis of water vapor  
ARC-10521 B72-10166 03  
Simple gas chromatographic system for analysis of microbial respiratory gases  
ARC-10403 B72-10207 03  
Hydrogen eliminator  
ARC-10408 B72-10208 03  
Counter lung  
ARC-10248 B72-10219 05  
Silver-chlorine fuel cell: A concept  
ARC-10491 B72-10221 03  
Polymeric coatings using electronic excitation  
HQ-10698 B72-10257 04  
Oxygen reclamation with solid oxide electrolytes  
ARC-10487 B72-10273 03  
Balanced-bellows spirometer  
XAC-01547 B72-10279 05  
Titanium alloy stress corrosion cracking in presence of dinitrogen tetroxide  
M-FS-21113 B72-10321 04  
Nonflammable potting, encapsulating and/or conformal coating compound  
MSC-13499 B72-10337 04  
Failure in glass  
AEC-10088 B72-10364 04  
Evaluating foam heterogeneity  
AEC-10046 B72-10365 04  
Metered oxygen supply aids treatment of domestic sewage  
ARC-10024 B72-10557 05
- Propulsion sizing program  
MSC-14016 B72-10605 09  
Breathing-metabolic simulator  
HQ-10766 B72-10657 05  
Metabolic simulation chamber  
HQ-10776 B72-10658 05  
An efficient prebreathing apparatus for humans during decompression  
MSC-14151 B72-10690 05
- OXYGEN ANALYZERS**  
Ear oximeter-transducer monitors four physiological responses  
XAC-05422 B72-10224 05  
A continuous physiological data collector  
M-FS-20835 B72-10402 05
- OXYGEN BREATHING**  
Aircrew oxygen system  
ARC-10247 B72-10195 05
- OXYGEN COMPOUNDS**  
Improved intensifying screen reduces X-ray exposure  
AEC-10090 B72-10232 03
- OXYGEN CONSUMPTION**  
Improved temperature control of liquid cooling garments  
MSC-13917 B72-10281 05
- OXYGEN FLUORIDES**  
Improved elastomer for use with oxygen difluoride  
ARC-10528 B72-10027 04  
Oxygen carrier for gas chromatographic analysis of inert gases in propellants  
ARC-10574 B72-10249 04  
Thermal control for storage of cryogenic propellants in a common-bulkhead tank: A concept  
ARC-10558 B72-10276 03
- OXYGEN PRODUCTION**  
Oxygen reclamation with solid oxide electrolytes  
ARC-10487 B72-10273 03  
Catalyst for sodium chlorate decomposition  
ARC-10584 B72-10305 04
- OXYGEN REGULATORS**  
Aircrew oxygen system  
ARC-10247 B72-10195 05
- OXYGEN SUPPLY EQUIPMENT**  
Aircrew oxygen system  
ARC-10247 B72-10195 05  
Controlled flow assembly  
M-FS-21716 B72-10404 07

## P

- P-I-N JUNCTIONS**  
Increasing the response of PIN photodiodes to the ultraviolet  
ARC-10274 B72-10053 03
- P-N JUNCTIONS**  
Oxygen-layer structure improves lithium-doped silicon solar cells  
NPO-11403 B72-10085 03  
Introduction of lithium into the front surface of solar cells  
NPO-11404 B72-10086 02  
A voltage-tunable three-terminal Gunn device  
HQ-10783 B72-10518 01
- P-N-P JUNCTIONS**  
Overlap diffusion for increasing phototransistor dynamic range  
M-FS-20407 B72-10347 01

**PACKAGES**

Guidelines for fabrication of hybrid microcircuits

M-FS-21964 872-10393 01

**PACKAGING**

Speed enhancement of complementary MOS devices

ARC-10387 872-10184 01

Phase-change materials handbook

M-FS-22064 872-10464 04

**PACKINGS (SEALS)**

Leak decay method of helium bombardment leak testing

M-FS-24109 872-10381 06

High-speed, self-acting shaft seal (circumferential type)

LEWIS-11274 872-10447 07

Computer program for calculating the temperature field of face seals

LEWIS-11110 872-10483 09

Improved silver-zinc battery-terminal seals

LEWIS-11615 872-10581 06

Improved lip seal for rotating shafts

LEWIS-11602 872-10672 07

**PAINTS**

Devolatilization of polymer resins

GSFC-11358 872-10280 04

Investigation of environmental effects on coatings for thermal control

M-FS-21932 872-10596 04

**PALLADIUM**

Hydrogen eliminator

ARC-10408 872-10208 03

Magnetic-doped alloys with very large Seebeck coefficients

M-FS-21410 872-10318 04

**PANELS**

Reduction of fan noise: A concept

ARC-10312 872-10040 06

Aluminum foil interconnects for solar cell panels

ARC-10374 872-10058 08

Compensating subreflector for two-reflector antennas: A concept

NPO-11503 872-10093 06

Micro regulating ball valve

ARC-10295 872-10121 06

Flexible shielding system for radiation protection

LRL-10028 872-10500 03

Response of a panel structure to reverberant acoustic excitation

M-FS-21774 872-10603 06

**PAPERS**

Novel dielectric reduces corona breakdown in ac capacitors

M-FS-21486 872-10505 01

**PARALLEL PLATES**

Parallel-plate viscometer

NPO-11387 872-10700 03

**PARAMAGNETISM**

Low temperature scale for a 1 to 20 degree Kelvin region

AEC-10007 872-10146 03

**PARAMETERIZATION**

Computer programs for the design of liquid-to-liquid jet pumps

LEWIS-11679 872-10584 09

FORTAN read package

MSC-14161 872-10750 09

**PARITY**

Topological solution of bilateral switching networks

ARC-10294 872-10055 01

**PARTIAL DIFFERENTIAL EQUATIONS**

Computer program draws three-dimensional surfaces

LEWIS-10482 872-10253 09

FORTAN program for generating a two-dimensional orthogonal mesh between two arbitrary boundaries

LEWIS-11863 872-10753 09

**PARTICLE ACCELERATION**

Velocity accelerator for particles

NPO-11349 872-10082 03

Properties of ionization breakdown of air at microwave frequencies and optimization of component dimensions for maximum microwave power

M-FS-21924 872-10316 01

**PARTICLE BEAMS**

Oscillation of laser-beam intensity as observed with beam splitters

ARC-10694 872-10572 03

**PARTICLE COLLISIONS**

A method of eliminating hydrogen maser wall shift

HQ-10663 872-10670 03

**PARTICLE DENSITY****(CONCENTRATION)**

Particle detection by a light-scattering technique

ARC-10384 872-10160 03

Particle detection with intensified laser beam

HQ-10645 872-10516 03

**PARTICLE DIFFUSION**

Particle detection with intensified laser beam

HQ-10645 872-10516 03

**PARTICLE SIZE DISTRIBUTION**

Particle detection with intensified laser beam

HQ-10645 872-10516 03

**PARTICLES**

Laser beam deflection control: A concept

MSC-13814 872-10411 02

Analysis of microsize particulates

ARC-10647 872-10565 04

**PASSIVITY**

Development of chip passivated monolithic complementary MISFET circuits with beam leads

M-FS-22264 872-10696 01

**PATIENTS**

Small, low cost, artificial kidney

AEC-10011 872-10371 05

**PATTERN RECOGNITION**

Speech therapy and voice recognition instrument

HQ-10628 872-10652 05

**PEARSON DISTRIBUTIONS**

Program for standard statistical distributions

M-FS-21466 872-10602 09

**PELLETS**

Real-time pair-feeding of animals

ARC-10302 872-10298 05

**PELLICLE**

Liquid-helium-cooled Michelson interferometer

ARC-10554 872-10217 03

**PENETRATION**

An empirical relationship for the penetration of 1 to 3 MeV electrons

LEWIS-11495 872-10144 04

Survey of information concerning large diameter deep hole drilling

AEC-10051 872-10238 08

**PENTANES**

Evaluating foam heterogeneity

AEC-10046 872-10365 04

**PERFORATING**

Indexing film with a fluidic sensor

MSC-14117 872-10501 02

**PERFORMANCE**

Accurate measurement of telemetry performance

NPO-11457 872-10089 02

Performance of silicon solar cell assemblies

NPO-11847 872-10186 01

A method for calculating the effects of design errors and measurement errors on pump performance

LEWIS-11503 872-10292 07

Oscillating hot-wire anemometer

NPO-11634 872-10609 02

Comparative performance of double-focus and quadrupole mass spectrometers

NPO-11689 872-10702 03

**PERFORMANCE PREDICTION**

Prediction of ducted fan performance

ARC-10615 872-10064 09

Reliability analysis based on operational success criteria

ARC-10490 872-10214 09

Mathematical analysis for the performance assessment of space communication parameters, IBM-360 version

GSFC-11523 872-10675 09

Integrated multi-path program analysis and cost technique (IMPACT)

M-FS-21880 872-10676 09

Final report on a study of low-density nozzle flows, with application to microthrust rockets

HQ-10761 872-10748 06

**PERFORMANCE TESTS**

Fabrication techniques for organic electrolyte battery

AEC-10019 872-10428 08

**PERMEABILITY**

Improved elastomer for use with oxygen difluoride

ARC-10528 872-10027 04

Halogenation of microcapsule walls

ARC-10410 872-10161 04

Water purification by reverse osmosis using heterocyclic polymer membranes

LANGLEY-10514 872-10230 04

High temperature permeameter for measuring magnetic properties

LEWIS-11609 872-10443 03

Reduction of porosity in aluminum weldments

MSC-14198 872-10734 08

**PERMEATING**

Advances in induction-heated plasma torch technology

LEWIS-11354 872-10151 03

**PERSONNEL**

High voltage protection network

ARC-10197 872-10119 02

**PERSONNEL MANAGEMENT**

FORTAN manpower account program

NPO-11973 872-10623 09

**PERSONNEL SUBSYSTEMS**

FORTAN manpower account program

NPO-11973 872-10623 09

**PERTURBATION**

Sensitive holographic detection of small aerodynamic perturbations

ARC-10422 872-10209 03

- Interplanetary Trajectories, Encke Method (ITEM)  
 GSFC-11576 B72-10604 09  
 Transonic divider for gas chromatograph effluents  
 NPO-11479 B72-10706 03
- PH**  
 A method of isolating organic compounds present in water  
 AEC-10010 B72-10044 04  
 Sensor capsule for diagnosis of gastric disorders  
 HQ-10767 B72-10531 05
- PHARMACOLOGY**  
 Covalent bonding of antibodies, of polystyrene latex beads: A concept  
 MSC-13906 B72-10006 05
- PHASE CONTROL**  
 Low distortion automatic phase control circuit  
 M-FS-21671 B72-10682 02
- PHASE DETECTORS**  
 Vibrating ribbon bolometer: A concept  
 XAC-10768 B72-10170 03  
 Low distortion automatic phase control circuit  
 M-FS-21671 B72-10682 02
- PHASE DIAGRAMS**  
 Computer program draws three-dimensional surfaces  
 LEWIS-10482 B72-10253 09
- PHASE LOCKED SYSTEMS**  
 Signal to noise measurement circuit  
 GSFC-11239 B72-10102 01
- PHASE MODULATION**  
 Sensitive holographic detection of small aerodynamic perturbations  
 ARC-10422 B72-10209 03
- PHASE SHIFT**  
 Vibrating ribbon bolometer: A concept  
 XAC-10768 B72-10170 03  
 Low phase-shift amplifier  
 NPO-11663 B72-10185 01  
 Nondestructive testing of microtab welds  
 ARC-10176 B72-10296 02  
 Low frequency sinusoidal pressure generator  
 LEWIS-11465 B72-10477 01  
 Design of microstrip components by computer  
 LANGLEY-11210 B72-10741 01
- PHASE SHIFT CIRCUITS**  
 The thin film microwave iris  
 LANGLEY-10511 B72-10548 02
- PHASE TRANSFORMATIONS**  
 Liquid methane gelled with methanol and water reduces rate of nitrogen absorption  
 LEWIS-11574 B72-10330 06  
 Phase-change materials handbook  
 M-FS-22064 B72-10464 04
- PHENOLIC RESINS**  
 Halogenation of microcapsule walls  
 ARC-10410 B72-10161 04
- PHENOLS**  
 A method of isolating organic compounds present in water  
 AEC-10010 B72-10044 04  
 Initiation of polymerization by tetrabutylammonium p-lithiophenoxide  
 ARC-10553 B72-10223 04
- PHOSPHATES**  
 Phosphorus in land-water systems  
 AEC-10049 B72-10429 05
- Research on bearing lubricants for use in a high vacuum  
 M-FS-22119 B72-10469 04  
 Boron-10 loaded inorganic shielding material  
 M-FS-22280 B72-10740 04
- PHOSPHONIUM COMPOUNDS**  
 Phosphonium chloride for thermal storage  
 ARC-10572 B72-10422 04
- PHOSPHORIC ACID**  
 Simple gas chromatographic system for analysis of microbial respiratory gases  
 ARC-10403 B72-10207 03  
 Improved photoetching fabrication method  
 LEWIS-11268 B72-10745 08
- PHOSPHORS**  
 Projections of scan patterns on human retina  
 ARC-10181 B72-10193 05  
 A visual-display and storage device  
 GSFC-10901 B72-10647 02
- PHOSPHORUS COMPOUNDS**  
 Radiation-induced nickel deposits  
 LEWIS-10965 B72-10456 04
- PHOSPHORYLATION**  
 Immobilized phosphorylase for synthesis of polysaccharides from glucose  
 ARC-10680 B72-10550 04
- PHOTOCATHODES**  
 Advanced infrared photomultiplier  
 M-FS-20941 B72-10152 03  
 Optical enhancement of sensitivity in laser Doppler velocity systems  
 ARC-10653 B72-10310 03  
 A sensitive image intensifier which uses inert gas  
 LRL-10024 B72-10312 03
- PHOTOCHEMICAL REACTIONS**  
 Silver-chlorine fuel cell: A concept  
 ARC-10491 B72-10221 03  
 Erasable holographic medium using cis-trans isomerization  
 M-FS-22062 B72-10720 03
- PHOTOCONDUCTIVE CELLS**  
 An optical quality meter suitable for cryogenic liquids  
 LEWIS-11814 B72-10686 06
- PHOTOCONDUCTIVITY**  
 High field CdS detector for infrared radiation  
 LANGLEY-11027 B72-10725 04
- PHOTOCONDUCTORS**  
 High solar intensity radiometer  
 LEWIS-11533 B72-10130 03  
 Sputter etching of hemispherical bearings  
 HQ-10712 B72-10534 08
- PHOTODIODES**  
 Increasing the response of PIN photodiodes to the ultraviolet  
 ARC-10274 B72-10053 03  
 Particle detection by a light-scattering technique  
 ARC-10384 B72-10160 03  
 An absentee monitoring device  
 KSC-10668 B72-10578 01
- PHOTOELECTRIC CELLS**  
 Solar experiment alignment system  
 ARC-10471 B72-10020 03  
 Wide angle solar sensor  
 NPO-11341 B72-10080 01  
 Nematic liquid crystals for optical shutters: A concept  
 NPO-11367 B72-10083 03
- Stable photosensor amplifiers  
 NPO-11561 B72-10100 01  
 Tornado detector and alarm  
 M-FS-20915 B72-10106 01  
 Time-lapse camera for microscopy  
 ARC-10423 B72-10125 05  
 Programmed physiological infusion system  
 ARC-10447 B72-10126 05  
 Illumination control system  
 ARC-10527 B72-10167 02  
 Projections of scan patterns on human retina  
 ARC-10181 B72-10193 05  
 Nondispersive infrared analyzer for specific gases in complex mixtures  
 ARC-10308 B72-10198 03  
 Visual sensitivity tester  
 ARC-10329 B72-10203 05  
 Ear oximeter-transducer monitors four physiological responses  
 XAC-05422 B72-10224 05  
 Broadband RF-distribution amplifier  
 NPO-11401 B72-10245 01  
 A magnetic mouse activity meter  
 HQ-10664 B72-10482 05  
 Photomultiplier blanking circuit  
 ARC-10593 B72-10561 01
- PHOTOELECTRIC EFFECT**  
 Photomultiplier blanking circuit  
 ARC-10593 B72-10561 01  
 Improved photoetching fabrication method  
 LEWIS-11268 B72-10745 08
- PHOTOELECTRIC EMISSION**  
 Advanced infrared photomultiplier  
 M-FS-20941 B72-10152 03  
 Simple dynamic electromagnetic radiation detector  
 LEWIS-11159 B72-10227 03  
 Photomultiplier blanking circuit  
 ARC-10593 B72-10561 01  
 Photoemissive coating  
 M-FS-22003 B72-10638 08
- PHOTOELECTRIC MATERIALS**  
 Thin-film ultraviolet detector and spectrometer  
 NPO-11432 B72-10701 03
- PHOTOELECTRICITY**  
 Nematic liquid crystals for optical shutters: A concept  
 NPO-11367 B72-10083 03  
 Stable photosensor amplifiers  
 NPO-11561 B72-10100 01
- PHOTOGRAPHIC DEVELOPERS**  
 Silver-chlorine fuel cell: A concept  
 ARC-10491 B72-10221 03  
 Radiation-induced nickel deposits  
 LEWIS-10965 B72-10456 04
- PHOTOGRAPHIC EQUIPMENT**  
 Annular objective apertures improve resolution of electron microscopes  
 ARC-10448 B72-10171 03  
 Film holder for curved vacuum platen  
 MSC-14120 B72-10542 07
- PHOTOGRAPHIC FILM**  
 Analog table look-up device identifies unknown terrain  
 MSC-13816 B72-10033 03  
 Time-lapse camera for microscopy  
 ARC-10423 B72-10125 05  
 Improved intensifying screen reduces X-ray exposure  
 AEC-10090 B72-10232 03  
 Radiation-induced nickel deposits  
 LEWIS-10965 B72-10456 04

- Neutron radiographic viewing system  
M-FS-22024 B72-10468 02  
A rapid, precise, reciprocating-  
movement color filter system  
GSFC-11255 B72-10497 07  
Indexing film with a fluidic sensor  
MSC-14117 B72-10501 02  
Film handling system for laser  
scanner/recorder  
MSC-14121 B72-10539 07  
Film holder for curved vacuum platen  
MSC-14120 B72-10542 07
- PHOTOGRAPHIC PLATES**  
Film holder for curved vacuum platen  
MSC-14120 B72-10542 07  
Optimal read/write memory system  
components  
M-FS-22044 B72-10697 01
- PHOTOGRAPHIC PROCESSING**  
Radiation-induced nickel deposits  
LEWIS-10965 B72-10456 04
- PHOTOGRAPHIC PROCESSING EQUIPMENT**  
Neutron radiographic viewing system  
M-FS-22024 B72-10468 02  
Film holder for curved vacuum platen  
MSC-14120 B72-10542 07
- PHOTOGRAPHIC RECORDING**  
Cine recording ophthalmoscope  
ARC-10399 B72-10189 05  
A rapid, precise, reciprocating-  
movement color filter system  
GSFC-11255 B72-10497 07
- PHOTOGRAPHY**  
Cine recording ophthalmoscope  
ARC-10399 B72-10189 05
- PHOTOMECHANICAL EFFECT**  
Rotary shutter mechanism contains  
optical elements  
GSFC-11244 B72-10387 03
- PHOTOMETERS**  
Projections of scan patterns on human  
retina  
ARC-10181 B72-10193 05  
Nondispersive infrared analyzer for  
specific gases in complex mixtures  
ARC-10308 B72-10198 03  
Lightning flash detection system  
ARC-10562 B72-10272 02
- PHOTOMETRY**  
Stable photosensor amplifiers  
NPO-11561 B72-10100 01
- PHOTOMICROGRAPHS**  
Time-lapse camera for microscopy  
ARC-10423 B72-10125 05
- PHOTOMICROGRAPHY**  
Long-term drift of thermocouples at  
1600 K  
LEWIS-11471 B72-10176 01  
Hand-held photomicroscopy system  
ARC-10468 B72-10190 03
- PHOTOMULTIPLIER TUBES**  
A liquid radiation detector with high  
spatial resolution  
MSC-13965 B72-10034 03  
Advanced infrared photomultiplier  
M-FS-20941 B72-10152 03  
Scanning technique for tracking small  
eye-movements  
ARC-10488 B72-10220 05  
Optical enhancement of sensitivity in  
laser Doppler velocity systems  
ARC-10653 B72-10310 03  
Rotary shutter mechanism contains  
optical elements  
GSFC-11244 B72-10387 03
- Metastable atom probe for measuring  
electron beam density profiles  
M-FS-21593 B72-10485 03  
A reusable prepositioned ATP reaction  
chamber  
HQ-10660 B72-10525 05  
Photomultiplier blanking circuit  
ARC-10593 B72-10561 01  
Computer program for fitting low-order  
polynomial splines by method of least  
squares  
LEWIS-11651 B72-10585 09
- PHOTON BEAMS**  
Oscillation of laser-beam intensity as  
observed with beam splitters  
ARC-10694 B72-10572 03
- PHOTONS**  
Increasing the response of PIN pho-  
todiodes to the ultraviolet  
ARC-10274 B72-10053 03  
A Compton scatter attenuation gamma  
ray spectrometer  
M-FS-21441 B72-10487 03
- PHOTOPLASTICITY**  
Optimal read/write memory system  
components  
M-FS-22044 B72-10697 01
- PHOTOSYNTHESIS**  
A dual-beam actinic light source for  
photosynthesis research  
ARC-10351 B72-10205 05
- PHOTOTRANSISTORS**  
New reaction tester accurate within  
56 microseconds  
MSC-13604 B72-10031 05  
Solid state television camera has no  
imaging tube  
M-FS-21553 B72-10254 02  
Overlap diffusion for increasing photo-  
transistor dynamic range  
M-FS-20407 B72-10347 01
- PHOTOTUBES**  
Nematic liquid crystals for optical  
shutters: A concept  
NPO-11367 B72-10083 03
- PHOTOVOLTAIC CELLS**  
Solar experiment alignment system  
ARC-10471 B72-10020 03  
High solar intensity radiometer  
LEWIS-11533 B72-10130 03
- PHYSICAL PROPERTIES**  
Improved thermally conducting electron  
transfer polymers  
GSFC-11304 B72-10291 04  
Graphite and boron-reinforced com-  
posite materials data summary  
M-FS-21691 B72-10294 04  
Polyimide foams provide thermal insula-  
tion and fire protection  
ARC-10464 B72-10300 04  
Thermally resistant polymers for fuel  
tank sealants  
M-FS-21232 B72-10358 04  
Polymeric binder for explosives  
AEC-10062 B72-10366 04  
Bondability of RTV silicon rubber  
AEC-10026 B72-10367 04  
Technique for increasing yield of trifluo-  
ronitrosomethane-tetrafluoroethylene lymer  
ARC-10566 B72-10418 04  
Phosphonium chloride for thermal  
storage  
ARC-10572 B72-10422 04  
Fabrication of carbon film composites  
for high-strength structures  
ARC-10613 B72-10423 04
- Leaching of nitroso rubber material  
removes uncured polymer  
MSC-17185 B72-10449 04  
Chemical modification of poly(p-  
phenylene) for use in ablative  
compositions  
ARC-10135 B72-10451 04  
Process for synthesizing and formulating  
condensed ring polymers  
LANGLEY-10423 B72-10473 04  
Functionally terminated liquid nitroso  
fluorocarbon terpolymers  
M-FS-21539 B72-10493 04  
PTFE films with improved flexibility  
NPO-12028 B72-10551 04  
Micro-scale crease-and-fold apparatus  
NPO-12029 B72-10552 06  
Improved silver-zinc battery-terminal  
seals  
LEWIS-11615 B72-10581 06  
Study of hot hardness characteristics  
of tool steels  
LEWIS-11785 B72-10583 04  
Thermal conductivity and electrical  
resistivity of porous materials  
LEWIS-11754 B72-10587 04  
Polyimide bonded graphite fluoride: A  
new long life solid lubricant coating  
LEWIS-11864 B72-10628 04  
Improved lip seal for rotating shafts  
LEWIS-11602 B72-10672 07  
Improved zinc oxide thermal control  
coatings  
NPO-11139 B72-10711 04  
Heat transfer correlations for kerosene  
fuels and mixtures and physical properties  
for Jet A fuel  
LEWIS-11652 B72-10742 04
- PHYSIOLOGICAL FACTORS**  
A continuous physiological data  
collector  
M-FS-20835 B72-10402 05
- PHYSIOLOGICAL RESPONSES**  
New reaction tester accurate within  
56 microseconds  
MSC-13604 B72-10031 05  
Ear oximeter-transducer monitors four  
physiological responses  
XAC-05422 B72-10224 05
- PHYSIOLOGICAL TESTS**  
Improved ultrasonic biomedical measur-  
ing apparatus  
ARC-10597 B72-10695 05
- PIEZOELECTRIC CRYSTALS**  
Piezoelectric transducer mosaic  
ARC-10509 B72-10014 01
- PIEZOELECTRIC TRANSDUCERS**  
Piezoelectric transducer mosaic  
ARC-10509 B72-10014 01  
Gravitational gradiometer measures  
mass changes  
M-FS-20814 B72-10140 03  
Continuous monitor for gas ratios in a  
mixture  
LEWIS-11095 B72-10229 05
- PIEZOELECTRICITY**  
Piezoelectric actuator uses sequentially-  
excited multiple elements: A concept  
NPO-11527 B72-10096 01  
A piezoelectrically actuated ball valve  
ARC-10338 B72-10204 06
- PIGMENTS**  
Plasma calcining of pigment particles  
for thermal control coatings  
M-FS-21267 B72-10320 04



- Study of in-situ degradation of thermal control surfaces  
M-FS-20892 872-10336 04
- Investigation of environmental effects on coatings for thermal control  
M-FS-21932 872-10596 04
- Improved zinc oxide thermal control coatings  
NPO-11139 872-10711 04
- PILOT TRAINING**  
Roll function in a flight simulator  
ARC-10557 872-10417 02
- PINS**  
Electrical grounding bracket  
ARC-10041 872-10045 01
- Squib-actuated disconnect device  
NPO-11544 872-10097 06
- Positive fast sealing union connections  
LEWIS-11290 872-10133 06
- Method of determining thermal conductivity in multi-layer insulation systems  
M-FS-20213 872-10154 03
- PIONEER SPACE PROBES**  
Speed enhancement of complementary MOS devices  
ARC-10387 872-10184 01
- PIPE FLOW**  
Use of small turbine-type flowmeters to measure flow in large pipes  
LEWIS-11851 872-10631 06
- Fill and vent quick disconnect  
M-FS-21822 872-10645 07
- A shut-off valve for flexible tubing  
M-FS-21731 872-10687 07
- Heat transfer correlations for kerosene fuels and mixtures and physical properties for Jet A fuel  
LEWIS-11652 872-10742 04
- PIPELINES**  
Automatic lightning location system  
AEC-10077 872-10372 02
- PIPES (TUBES)**  
Pressure sensitive gas flow meter  
ARC-10219 872-10049 06
- Velocity accelerator for particles  
NPO-11349 872-10082 03
- Tubing cutter  
NPO-11524 872-10095 07
- Longitudinal friction forces in piping design  
M-FS-13754 872-10103 01
- Low noise electromagnetic flowmeter  
M-FS-21291 872-10108 02
- Glass technology involved in the manufacture of magnetometer components  
GSFC-11283 872-10132 03
- High-temperature, long-life thyatron  
LEWIS-11327 872-10134 01
- Cryogenic gel flow viscometer  
ARC-10523 872-10180 03
- Heart catheter cable and connector  
ARC-10406 872-10200 05
- Energy absorber uses expanded coiled tube  
AEC-10044 872-10239 06
- Pressure-probe assembly for wind tunnels  
ARC-10569 872-10248 03
- An electrohydrodynamic heat pipe  
ARC-10601 872-10251 03
- A cryopump for cooling objects at a distance  
LRL-10031 872-10314 03
- Remote control flare stack igniter for combustible gases  
M-FS-21675 872-10352 07
- Low cost anti-galling bushings  
LEWIS-11724 872-10359 08
- Noncontaminating technique for making holes in existing process systems  
LEWIS-11595 872-10385 07
- Nonsteady flow-direction measurement  
LEWIS-11499 872-10403 06
- Enhanced Lamb dip for absolute laser frequency stabilization  
HQ-10695 872-10481 02
- Dry ice plug for hydraulic and pneumatic pipe flushing  
MSC-12548 872-10496 06
- High-intensity source of extreme ultraviolet  
HQ-10754 872-10528 03
- Hydrophobic liquid/gas separator for heat pipes  
ARC-10656 872-10549 03
- Propellant feed systems transients  
MSC-17848 872-10677 06
- Portable beveling tool  
M-FS-16863 872-10678 07
- A shut-off valve for flexible tubing  
M-FS-21731 872-10687 07
- Gas-flow restrictor  
NPO-10117 872-10703 03
- Optimization of fluid line sizes with pumping power penalty IBM-360 computer program  
MSC-17930 872-10722 06
- Reduction of porosity in aluminum weldments  
MSC-14198 872-10734 08
- PISTONS**  
Gyro spring augmentation system  
ARC-10496 872-10010 06
- Squib-actuated disconnect device  
NPO-11544 872-10097 06
- Thermal-powered reciprocating pump  
NPO-11417 872-10723 06
- PITCH (INCLINATION)**  
Inertial reference unit  
NPO-11518 872-10094 02
- Interferometric rotation sensor  
ARC-10278 872-10274 03
- PITOT TUBES**  
A stagnation pressure probe for use in supersonic flow  
LANGLEY-11139 872-10543 06
- PIVOTS**  
Universal inverted flexure  
ARC-10345 872-10122 07
- Latch mechanism  
M-FS-21606 872-10457 08
- PLANAR STRUCTURES**  
Topological solution of bilateral switching networks  
ARC-10294 872-10055 01
- Interconnections for fluidic circuits  
ARC-10481 872-10164 02
- PLANETARY ATMOSPHERES**  
Improved high-performance shock tube  
NPO-11885 872-10242 03
- PLANETARY ORBITS**  
Rapid analysis of electric propulsion missions  
ARC-10430 872-10299 09
- PLANETARY SURFACES**  
Planetary rock corer and drill concepts  
NPO-11416 872-10398 07
- Energy absorbing system for mechanical impacts  
NPO-10671 872-10712 06
- PLANTS (BOTANY)**  
Illumination control system  
ARC-10527 872-10167 02
- A dual-beam actinic light source for photosynthesis research  
ARC-10351 872-10205 05
- PLASMA CONTROL**  
Advances in induction-heated plasma torch technology  
LEWIS-11354 872-10151 03
- PLASMA DENSITY**  
Laser frequency modulation with electron plasma  
AEC-10079 872-10373 03
- PLASMA DIAGNOSTICS**  
Measurement of electron density and temperature in plasmas  
ARC-10598 872-10563 03
- PLASMA DYNAMICS**  
Interferometric measurement of the velocity of radiating particles  
HQ-10371 872-10495 03
- PLASMA ELECTRODES**  
Pulsed high-power arc heater with improved cathode and triggering mechanism  
ARC-10173 872-10048 03
- PLASMA GENERATORS**  
Pulsed high-power arc heater with improved cathode and triggering mechanism  
ARC-10173 872-10048 03
- Advances in induction-heated plasma torch technology  
LEWIS-11354 872-10151 03
- Computation of laminar heat transfer from gaseous plasmas in electromagnetic fields  
NPO-11725 872-10707 03
- PLASMA HEATING**  
Advances in induction-heated plasma torch technology  
LEWIS-11354 872-10151 03
- Plasma calcining of pigment particles for thermal control coatings  
M-FS-21267 872-10320 04
- Oxygen plasmas used to synthesize superoxides  
ARC-10686 872-10570 04
- PLASMA JETS**  
Interferometric measurement of the velocity of radiating particles  
HQ-10371 872-10495 03
- PLASMA PHYSICS**  
Advances in induction-heated plasma torch technology  
LEWIS-11354 872-10151 03
- PLASMA PROPULSION**  
Computation of laminar heat transfer from gaseous plasmas in electromagnetic fields  
NPO-11725 872-10707 03
- PLASMAS (PHYSICS)**  
Plasma calcining of pigment particles for thermal control coatings  
M-FS-21267 872-10320 04
- PLASTIC DEFORMATION**  
Experimental study of surface cracks  
MSC-14032 872-10019 04
- New compression molding process of thermosetting plastic compounds  
LANGLEY-10782 872-10356 08
- PLASTIC FLOW**  
Explosive cord  
M-FS-21928 872-10293 08
- PLASTIC PROPERTIES**  
Analysis of thermal stress and metal movement during welding  
M-FS-20984 872-10333 04

**PLASTIC TAPES**

Thermocouple tape  
LEWIS-11072 872-10515 04

**PLASTICS**

Use of thin plastic films at cryogenic temperatures  
LEWIS-11047 872-10038 04  
Sheet plastic filters for solar cells  
NPO-11464 872-10090 04  
An economical vent cover  
M-FS-20692 872-10348 07  
Evaluating foam heterogeneity  
AEC-10046 872-10365 04  
Built-in bleeder system in laminated plastic structures  
MSC-17713 872-10562 08  
A monostain test apparatus  
M-FS-24221 872-10679 06

**PLATENS**

Film handling system for laser scanner/recorder  
MSC-14121 872-10539 07

**PLATES (STRUCTURAL MEMBERS)**

Electromagnetic rheometer  
ARC-10525 872-10416 04  
Effects of nonuniform swash-plate stiffness on coupled blade-control system dynamics and stability  
LANGLEY-11068 872-10749 06

**PLATFORMS**

Position indicating, rotating boom  
LANGLEY-11202 872-10066 07  
Three-point compound sine plate offers cost and weight savings  
MSC-15818 872-10118 07

**PLATING**

Ion plating seals microcracks or porous metal components  
LEWIS-11657 872-10397 04  
A new low-cost method for producing collimating mirrors  
LEWIS-11553 872-10513 08

**PLATINUM**

Low temperature catalytic ignition of hydrogen and oxygen  
ARC-10492 872-10127 03  
Low temperature scale for a 1 to 20 degree Kelvin region  
AEC-10007 872-10146 03  
Carbon dioxide concentrator  
ARC-10245 872-10194 05  
High-temperature ceramic-to-ceramic seals  
ARC-10319 872-10199 04  
Comparison of catalyst activity  
ARC-10493 872-10201 04  
Oxygen reclamation with solid oxide electrolytes  
ARC-10487 872-10273 03  
Amplifier for signal from thin film transducer  
LEWIS-11494 872-10463 01  
Humidity resistant solar cell contacts  
HQ-10674 872-10517 04

**PLATINUM COMPOUNDS**

Development of chip passivated monolithic complementary MISFET circuits with beam leads  
M-FS-22264 872-10696 01

**PLENUM CHAMBERS**

Removal of filler material from large high energy formed parts  
M-FS-16326 872-10104 06  
Dynamic valve to supply constant total thrust to two orifice jets  
ARC-10239 872-10120 07

Two-stage coaxial gas compressor  
ARC-10426 872-10210 06

**PLOTTERS**

Visual sensitivity tester  
ARC-10329 872-10203 05  
Computer program draws three-dimensional surfaces  
LEWIS-10482 872-10253 09  
Snap dynamics  
M-FS-21531 872-10265 09

**PLOTTING**

Program for the transient response of ablating axisymmetric bodies including the effects of shape change  
LANGLEY-11049 872-10068 09  
Computer program draws three-dimensional surfaces  
LEWIS-10482 872-10253 09

**PLUGS**

Hydrophobic liquid/gas separator for heat pipes  
ARC-10656 872-10549 03

**PLUMES**

Hydraulic modeling of heat dispersion in large lakes  
AEC-10003 872-10039 03

**PLUNGERS**

A cable stabilizer for outdoor elevators  
KSC-10513 872-10283 07

**PNEUMATIC CONTROL**

Thermal control for storage of cryogenic propellants in a common-bulkhead tank: A concept  
ARC-10558 872-10276 03  
Intravenous fluid flow meter concept for zero gravity environment  
MSC-14123 872-10461 05  
Integrated monopropellant thruster  
NPO-12004 872-10502 06

**PNEUMATIC EQUIPMENT**

Weight simulator  
ARC-10100 872-10046 05  
Nondispersive infrared analyzer for specific gases in complex mixtures  
ARC-10308 872-10198 03  
Survey of aircraft electrical power systems  
LEWIS-11678 872-10383 02  
Controlled flow assembly  
M-FS-21716 872-10404 07  
Sterile chamber operation with bio-isolator suit system  
LANGLEY-11054 872-10547 05  
High pressure liquid gas pump  
MSC-14087 872-10590 06  
Concentric-seating poppet  
NPO-11658 872-10704 06

**PNEUMATICS**

Interconnections for fluidic circuits  
ARC-10481 872-10164 02

**POINTS (MATHEMATICS)**

Cubic spline functions for curve fitting  
LRL-10034 872-10311 09  
Numerical solution of potential flow problems in terms of flux components  
M-FS-21751 872-10667 09

**POLARIMETERS**

Optical bonding agents for severe environments  
ARC-10459 872-10063 04

**POLARITY**

Inertial reference unit  
NPO-11518 872-10094 02

Compensation of voltage drops in solid-state switches used with thermoelectric generators  
NPO-11388 872-10138 01

Vidicon storage tube electrical input/output  
MSC-14053 872-10285 02

**POLARIZATION (CHARGE SEPARATION)**

A piezoelectrically actuated ball valve  
ARC-10338 872-10204 06

**POLARIZATION (WAVES)**

Acousto-optic filter for electronic laser tuning  
HQ-10715 872-10520 03

**POLARIZERS**

Efficient wire-grid duplexer-polarized for CO<sub>2</sub> lasers  
GSFC-11403 872-10440 03

**POLISHING**

An improved apochromatic wedge utilizing optical molecular contact bonding  
GSFC-11082 872-10388 03  
Machine finishes balls to high degree of roundness  
M-FS-21448 872-10595 08

**POLYCRYSTALS**

Improved synthesis of intermetal compounds  
HQ-10690 872-10172 04

**POLYETHYLENES**

Hydrophobic liquid/gas separator for heat pipes  
ARC-10656 872-10549 03

**POLYIMIDE RESINS**

New polyimide polymer has excellent processing characteristics with improved thermo-oxidative and hydrolytic stabilities  
LEWIS-11323 872-10175 04  
Polyimide foams provide thermal insulation and fire protection  
ARC-10464 872-10300 04  
Titanium reinforced boron polyimide composite  
M-FS-21916 872-10353 04  
Low-void polyimide resins for autoclave processing  
LEWIS-11665 872-10728 04

**POLYIMIDES**

New polyimide polymer has excellent processing characteristics with improved thermo-oxidative and hydrolytic stabilities  
LEWIS-11323 872-10175 04  
Flexible, low-cost silicon solar cell arrays  
LEWIS-11069 872-10177 02  
Development of a polyimide for use as a temperature and solvent resistant sealant  
M-FS-21325 872-10262 04

Synthesis of temperature and solvent-resistant polymers  
M-FS-20848 872-10342 04

Internal capillary insulation for cryogenic tanks  
LEWIS-11234 872-10626 06

Polyimide bonded graphite fluoride: A new long life solid lubricant coating  
LEWIS-11864 872-10628 04

Low-void polyimide resins for autoclave processing  
LEWIS-11665 872-10728 04

**POLYMER CHEMISTRY**

Fire retardant polyisocyanurate foam  
ARC-10280 872-10269 04

- Chemical modification of poly(p-phenylene) for use in ablative compositions  
 ARC-10135 872-10451 04  
 Functionally terminated liquid nitroso fluorocarbon terpolymers  
 M-FS-21539 872-10493 04
- POLYMER PHYSICS**  
 Impact sensitivity of materials in contact with liquid and gaseous oxygen at high pressure  
 M-FS-21930 872-10476 06  
 Functionally terminated liquid nitroso fluorocarbon terpolymers  
 M-FS-21539 872-10493 04
- POLYMERIC FILMS**  
 Use of thin plastic films at cryogenic temperatures  
 LEWIS-11047 872-10038 04  
 Sheet plastic filters for solar cells  
 NPO-11464 872-10090 04  
 Halogenation of microcapsule walls  
 ARC-10410 872-10161 04  
 Overlay board for control consoles  
 ARC-10007 872-10191 02  
 Impact sensitivity of materials in contact with liquid and gaseous oxygen at high pressure  
 M-FS-21930 872-10476 06  
 PTFE films with improved flexibility  
 NPO-12028 872-10551 04  
 Micro-scale crease-and-fold apparatus  
 NPO-12029 872-10552 06  
 Photoemissive coating  
 M-FS-22003 872-10638 08  
 Reverse-osmosis membranes by plasma polymerization  
 ARC-10696 872-10710 04
- POLYMERIZATION**  
 Initiation of polymerization by tetrabutylammonium p-lithiophenoxide  
 ARC-10553 872-10223 04  
 Polymeric coatings using electronic excitation  
 HQ-10698 872-10257 04  
 Technique for increasing yield of trifluoronitrosomethane-tetrafluoroethylene lymer  
 ARC-10566 872-10418 04  
 Free-radical solution-polymerization of trifluoronitrosomethane with tetrafluoroethylene  
 ARC-10567 872-10419 04  
 Process for synthesizing and formulating condensed ring polymers  
 LANGLEY-10423 872-10473 04  
 Photoemissive coating  
 M-FS-22003 872-10638 08  
 Reverse-osmosis membranes by plasma polymerization  
 ARC-10696 872-10710 04
- POLYMERS**  
 Flame resistant elastic elastomeric fibers  
 MSC-13923-4 872-10005 04  
 Zero-leakage valves  
 ARC-10506 872-10024 06  
 Electrodes for sealed secondary batteries  
 ARC-10238 872-10050 02  
 Devolatilization of polymer resins  
 GSFC-11358 872-10280 04  
 A new vibration dampening adhesive  
 MSC-17668 872-10284 04  
 Improved thermally conducting electron transfer polymers  
 GSFC-11304 872-10291 04
- Synthesis of temperature and solvent-resistant polymers  
 M-FS-20848 872-10342 04  
 Titanium reinforced boron polyimide composite  
 M-FS-21916 872-10353 04  
 Thermally resistant polymers for fuel tank sealants  
 M-FS-21232 872-10358 04  
 Polymeric binder for explosives  
 AEC-10062 872-10366 04  
 Bondability of RTV silicon rubber  
 AEC-10026 872-10367 04  
 Strengthening lightweight concrete  
 AEC-10017 872-10430 04  
 Leaching of nitroso rubber material removes uncured polymer  
 MSC-17185 872-10449 04  
 Preparation of stable colloidal dispersions in fluorinated liquids  
 HQ-10580 872-10529 04
- POLYNOMIALS**  
 Third order digital-to-analog converter  
 MSC-12458 872-10030 02  
 Computer program for fitting low-order polynomial splines by method of least squares  
 LEWIS-11651 872-10585 09
- POLYPHENYLS**  
 Chemical modification of poly(p-phenylene) for use in ablative compositions  
 ARC-10135 872-10451 04
- POLYPROPYLENE**  
 Novel dielectric reduces corona breakdown in ac capacitors  
 M-FS-21486 872-10505 01
- POLYSACCHARIDES**  
 Immobilized phosphorylase for synthesis of polysaccharides from glucose  
 ARC-10680 872-10550 04
- POLYSTYRENE**  
 Covalent bonding of antibodies of polystyrene latex beads: A concept  
 MSC-13906 872-10006 05
- POLYTETRAFLUOROETHYLENE**  
 Zero-leakage valves  
 ARC-10506 872-10024 06  
 Electrodes for sealed secondary batteries  
 ARC-10238 872-10050 02  
 Promotion of dropwise condensation of ethyl alcohol, methyl alcohol, and acetone by polytetrafluoroethylene  
 LANGLEY-10940 872-10115 04  
 Micro regulating ball valve  
 ARC-10295 872-10121 06  
 Nonflammable and abrasion resistant coating process for glass fibers  
 MSC-14024 872-10445 08
- POLYURETHANE FOAM**  
 Method of determining thermal conductivity in multi-layer insulation systems  
 M-FS-20213 872-10154 03  
 High strength, medium density molded foam  
 AEC-10053 872-10235 04  
 Fire retardant polyisocyanurate foam  
 ARC-10280 872-10269 04
- POLYURETHANE RESINS**  
 Adhesive for aluminum withstands cryogenic temperatures  
 M-FS-16848 872-10346 04  
 New type of trifunctional alcohol  
 NPO-10714 872-10553 04
- POLYVINYL CHLORIDE**  
 Electrodes for sealed secondary batteries  
 ARC-10238 872-10050 02  
 Reduction of porosity in aluminum weldments  
 MSC-14198 872-10734 08
- POROSITY**  
 Ion plating seals microcracks or porous metal components  
 LEWIS-11657 872-10397 04  
 Humidity resistant solar cell contacts  
 HQ-10674 872-10517 04
- POROUS MATERIALS**  
 Water purification by reverse osmosis using heterocyclic polymer membranes  
 LANGLEY-10514 872-10230 04  
 Flow equation for porous plug and capillary tube flow restrictors  
 GSFC-11387 872-10289 06  
 Stabilization of porous glass reverse-osmosis membranes  
 ARC-10646 872-10309 04  
 Thermal conductivity and electrical resistivity of porous materials  
 LEWIS-11754 872-10587 04  
 Reduction of porosity in aluminum weldments  
 MSC-14198 872-10734 08  
 Joining porous components to solid metal structures  
 LEWIS-11259 872-10754 08
- POROUS PLATES**  
 A permeable rotating-wheel solvent extractor  
 LRL-10033 872-10343 04
- PORTABLE EQUIPMENT**  
 Laboratory leak tester provides high sensitivity  
 AEC-10042 872-10240 03  
 Noncontaminating technique for making holes in existing process systems  
 LEWIS-11595 872-10385 07  
 Portable beveling tool  
 M-FS-16863 872-10678 07  
 An efficient prebreathing apparatus for humans during decompression  
 MSC-14151 872-10690 05
- PORTABLE LIFE SUPPORT SYSTEMS**  
 Regenerable metallic oxide systems for removal of carbon dioxide: A concept  
 ARC-10570 872-10420 04
- PORTS (OPENINGS)**  
 Diatomic infrared gasdynamic laser permits selection of wavelengths  
 ARC-10370 872-10206 03  
 A valve concept for remote fluid flow control  
 M-FS-16097 872-10400 07
- POSITION (LOCATION)**  
 A magnetic mouse activity meter  
 HQ-10664 872-10482 05  
 Electronic integrator for gyro rate output voltages  
 NPO-11499 872-10555 01
- POSITION ERRORS**  
 Adaptive position control loop  
 ARC-10255 872-10052 02
- POSITION INDICATORS**  
 Automatic lightning location system  
 AEC-10077 872-10372 02
- POSITIONING**  
 Optical alignment of electrodes on electrical discharge machines  
 XAC-09489 872-10036 07

**POSITIONING DEVICES (MACHINERY)**

- Low-friction ball-and-socket  
NPO-11348 872-10081 08  
Ball detent mechanism  
M-FS-21735 872-10470 07

**POTABLE WATER**

- Mercury in the environment  
AEC-10048 872-10233 05

**POTASSIUM, CHLORIDES**

- Al/C12 molten salt battery  
HQ-10696 872-10527 01

**POTASSIUM COMPOUNDS**

- Space-suit carbon dioxide absorption system: A concept  
ARC-10546 872-10168 05  
Carbon dioxide concentrator  
ARC-10245 872-10194 05

**POTENTIAL FLOW**

- Numerical solution of potential flow problems in terms of flux components  
M-FS-21751 872-10667 09

**POTENTIOMETERS**

- Comparison of catalyst activity  
ARC-10493 872-10201 04

**POTENTIOMETERS (INSTRUMENTS)**

- Hand-held photomicroscopy system  
ARC-10468 872-10190 03

**POTENTIOMETERS (RESISTORS)**

- Improved device measures performance of batteries under load  
ARC-10252 872-10051 02  
Circuit permits independent adjustment of gain and offset at constant input impedance  
ARC-10348 872-10057 01  
Voltage-tunable parallel-T filter for remote operation  
NPO-11165 872-10077 01  
Heart simulator  
M-FS-21609 872-10131 02  
Potentiometer, constant tension and lubrication device  
KSC-10723 872-10541 02

**POTTING COMPOUNDS**

- Devolatilization of polymer resins  
GSFC-11358 872-10280 04

**POWDER (PARTICLES)**

- Plasma calcining of pigment particles for thermal control coatings  
M-FS-21267 872-10320 04  
Sintered diamond compacts using metallic cobalt binders  
HQ-10706 872-10519 04

**POWDER METALLURGY**

- High strength alloy for immediate temperature, 24 to 704 C (75 to 1300 F), applications  
LEWIS-11634 872-10344 04  
Dispersion-strengthened chromium alloy  
LEWIS-10982 872-10378 04  
Polishing is made cheaper by disposable diamond-impregnated abrasive cloth  
MSC-14247 872-10616 08

**POWER AMPLIFIERS**

- Improved audio reproduction system  
ARC-10404 872-10059 01  
A differential ECG amplifier with single-ended output  
ARC-10411 872-10061 05  
A brushless dc spin motor for momentum exchange altitude control  
M-FS-14952 872-10448 02  
Remote measurement of the water content of snowpacks  
ARC-10651 872-10567 03

- Automatic method of measuring silicon-controlled-rectifier holding current  
LEWIS-11898 872-10752 02

**POWER CONDITIONING**

- Peak-power-point monitor for solar panel  
NPO-11708 872-10694 02  
Comparative performance of double-focus and quadrupole mass spectrometers  
NPO-11689 872-10702 03

**POWER LIMITERS**

- Wideband wattmeter for instant measurement of real power  
LEWIS-11698 872-10737 01

**POWER PLANTS**

- Hydraulic modeling of heat dispersion in large lakes  
AEC-10003 872-10039 03

**POWER SPECTRA**

- Acoustic spectral analysis and testing techniques  
NPO-11554 872-10341 03  
A study of the power spectral density of an FM signal  
M-FS-21070 872-10361 02  
Program to determine space vehicle response to wind turbulence  
M-FS-21614 872-10410 09  
Loudness (annoyance), prediction procedure for steady sounds  
LEWIS-11761 872-10579 05

**POWER SUPPLIES**

- Cine recording ophthalmoscope  
ARC-10399 872-10189 05

**POWER SUPPLY CIRCUITS**

- Circuit controls turn-on current  
NPO-11339 872-10079 01  
Speed enhancement of complementary MOS devices  
ARC-10387 872-10184 01  
A rapid, precise, reciprocating-movement color filter system  
GSFC-11255 872-10497 07  
Waveguide switch protector  
NPO-11592 872-10705 01

**POWER TRANSMISSION**

- Transmission of optical frequencies with minimal losses  
HQ-10541 872-10389 03

**PREAMPLIFIERS**

- Pulse excitation of bolometer bridges  
ARC-10292 872-10054 01  
Lightweight, broad-band spectrum analyzer  
ARC-10405 872-10060 01  
Differential input preamplifier  
ARC-10489 872-10165 01  
Wide-range dynamic pressure sensor  
ARC-10263 872-10196 03

**PRECESSION**

- Wide-range nuclear magnetic resonance detector  
LEWIS-11513 872-10478 03

**PRECIPITATION HARDENING**

- Joining precipitation-hardened nickel-base alloys by friction welding  
LEWIS-11514 872-10288 08  
Dispersion-strengthened chromium alloy  
LEWIS-10982 872-10378 04

**PREDICTION ANALYSIS TECHNIQUES**

- Sunspot analysis and prediction  
M-FS-21724 872-10317 03

**PRELAUNCH TESTS**

- Program to determine space vehicle response to wind turbulence  
M-FS-21614 872-10410 09

**PREPOLYMERS**

- New polyimide polymer has excellent processing characteristics with improved thermo-oxidative and hydrolytic stabilities  
LEWIS-11323 872-10175 04  
Process for synthesizing and formulating condensed ring polymers  
LANGLEY-10423 872-10473 04

**PRESERVATIVES**

- Stabilization of lactate dehydrogenase  
ARC-10415 872-10062 05

**PRESERVING**

- Quick, easy to prepare freeze-dried soups  
MSC-14003 872-10017 05

**PRESSURE**

- An improved aesthesiometer  
MSC-13609 872-10032 05  
Weight simulator  
ARC-10100 872-10046 05  
High-temperature, long-life thyatron  
LEWIS-11327 872-10134 01  
Heart catheter cable and connector  
ARC-10406 872-10200 05  
Balanced-bellows spirometer  
XAC-01547 872-10279 05  
Multipurpose top for liquid helium Dewar  
ARC-10533 872-10302 03  
An economical vent cover  
M-FS-20692 872-10348 07  
Noncontaminating technique for making holes in existing process systems  
LEWIS-11595 872-10385 07  
Low frequency sinusoidal pressure generator  
LEWIS-11465 872-10477 01  
Sintered diamond compacts using metallic cobalt binders  
HQ-10706 872-10519 04  
Mechanically and thermally stable maser cavity resonator  
HQ-10790 872-10523 01  
Sensor capsule for diagnosis of gastric disorders  
HQ-10767 872-10531 05  
Leak test system  
M-FS-21788 872-10576 06  
Analysis and computer programs to calculate acoustic wave properties of baffled chambers  
LEWIS-11529 872-10577 09  
Computer program for quasi-three-dimensional calculation of surface velocities and choking flow for turbomachine blade rows  
LEWIS-11635 872-10586 09  
High strength high modulus ceramic fiber  
M-FS-21266 872-10592 04  
Machine finishes balls to high degree of roundness  
M-FS-21448 872-10595 08  
Thermal induced flow oscillations in heat exchangers for supercritical fluids  
M-FS-21262 872-10598 06  
Study of high altitude plume impingement  
M-FS-21414 872-10601 09  
Linear accelerator: A concept  
KSC-10618 872-10636 06

Fluid operated quick release mechanism  
M-FS-20205 B72-10640 07  
Quick-donning backpack harness  
LANGLEY-10102 B72-10641 05

**PRESSURE BREATHING**

Aircrew oxygen system  
ARC-10247 B72-10195 05  
An efficient prebreathing apparatus for humans during decompression  
MSC-14151 B72-10690 05

**PRESSURE CHAMBERS**

Propellant-powered actuator for gas generators  
ARC-10484 B72-10008 03

**PRESSURE DISTRIBUTION**

Flow equation for porous plug and capillary tube flow restrictors  
GSFC-11387 B72-10289 06  
Constant tension device for gravity simulation  
M-FS-21618 B72-10466 06

**PRESSURE DROP**

Cryogenic gel flow viscometer  
ARC-10523 B72-10180 03  
Airlock caution and warning system  
M-FS-21576 B72-10467 02  
Optimization of fluid line sizes with pumping power penalty IBM-360 computer program  
MSC-17930 B72-10722 06

**PRESSURE GRADIENTS**

Program for calculating laminar and turbulent boundary layers in arbitrary pressure gradients  
LEWIS-11097 B72-10111 09  
Self-aligning, low-pressure sealing poppet valve  
MSC-17745 B72-10538 07  
Water impact loads  
M-FS-21955 B72-10621 09

**PRESSURE MEASUREMENTS**

Method of determining thermal conductivity in multi-layer insulation systems  
M-FS-20213 B72-10154 03  
Wide-range dynamic pressure sensor  
ARC-10263 B72-10196 03  
Laboratory leak tester provides high sensitivity  
AEC-10042 B72-10240 03  
A stagnation pressure probe for use in supersonic flow  
LANGLEY-11139 B72-10543 06  
Probe measures gas and liquid mass flux in high mass flow ratio two-phase flows  
LEWIS-11270 B72-10546 06  
A multielement probe for coincident temperature and pressure measurements  
LEWIS-11775 B72-10716 06

**PRESSURE REDUCTION**

Airflow distribution control for improved turbine engine performance  
LEWIS-11593 B72-10178 07  
Leak test system  
M-FS-21788 B72-10576 06  
Experimental study of flow distribution with circumferential manifolds  
LEWIS-11649 B72-10738 06

**PRESSURE REGULATORS**

Propellant-powered actuator for gas generators  
ARC-10484 B72-10008 03  
Pressure sensitive gas flow meter  
ARC-10219 B72-10049 06  
Fluidic pressure regulators  
ARC-10474 B72-10162 06

Miniature high pressure regulator  
ARC-10428 B72-10211 07  
Counter lung  
ARC-10248 B72-10219 05  
A closed loop cryogenic environment pressure regulating system  
MSC-13880 B72-10390 02  
Combination pressure regulator and safety valve: A concept  
MSC-14088 B72-10446 06  
Low frequency sinusoidal pressure generator  
LEWIS-11465 B72-10477 01

**PRESSURE SENSORS**

Oxygen pressure control for electrolysis cells  
ARC-10250 B72-10074 02  
Fluidic ignition detection  
M-FS-21498 B72-10158 06  
Wide-range dynamic pressure sensor  
ARC-10263 B72-10196 03  
Pressure-probe assembly for wind tunnels  
ARC-10569 B72-10248 03  
Thermal control for storage of cryogenic propellants in a common-bulkhead tank: A concept  
ARC-10558 B72-10276 03  
Nonsteady flow-direction measurement  
LEWIS-11499 B72-10403 06  
Low frequency sinusoidal pressure generator  
LEWIS-11465 B72-10477 01  
Probe measures gas and liquid mass flux in high mass flow ratio two-phase flows  
LEWIS-11270 B72-10546 06  
Leak test system  
M-FS-21788 B72-10576 06  
Diode-quad bridge for reactive transducers and FM discriminators  
ARC-10364 B72-10691 01  
Automated analysis of blood pressure measurements (Korotkov sound)  
MSC-13999 B72-10756 05

**PRESSURE VESSEL DESIGN**

Structural design and stress analysis program for advanced composite filament-wound axisymmetric pressure vessels (COMTANK)  
NPO-11943 B72-10073 09

**PRESSURE VESSELS**

Simple method for forming thin-wall pressure vessels  
ARC-10511 B72-10025 08  
Structural design and stress analysis program for advanced composite filament-wound axisymmetric pressure vessels (COMTANK)  
NPO-11943 B72-10073 09  
High torque bellows seal rotary drive  
LEWIS-11813 B72-10681 07

**PRESSURIZED CABINS**

Leak test system  
M-FS-21788 B72-10576 06

**PRESSURIZING**

Flexible, low-cost silicon solar cell arrays  
LEWIS-11069 B72-10177 02  
Expandable coating cocoon leak detection system  
M-FS-21848 B72-10380 06

**PRESTRESSING**

Perload indicating turnbuckle  
M-FS-21488 B72-10355 07

**PREVENTION**

Radiological control manual  
M-FS-22092 B72-10460 03

**PRINTED CIRCUITS**

Improved electrical spot terminals  
NPO-10034 B72-10492 01  
Magnetic circuitry mutual coupling probe  
M-FS-21664 B72-10535 02

**PRINTOUTS**

Programmed physiological infusion system  
ARC-10447 B72-10126 05

**PRISMS**

Optical bonding agents for severe environments  
ARC-10459 B72-10063 04  
Solar sensor with autocollimator  
ARC-10148 B72-10192 03  
Optical enhancement of sensitivity in laser Doppler velocity systems  
ARC-10653 B72-10310 03  
An improved apochromatic wedge utilizing optical molecular contact bonding  
GSFC-11082 B72-10388 03  
Precision machining of steel decahedrons  
M-FS-21361 B72-10597 07

**PROBABILITY DENSITY FUNCTIONS**

Program for standard statistical distributions  
M-FS-21466 B72-10602 09

**PROBABILITY THEORY**

Analog table look-up device identifies unknown terrain  
MSC-13816 B72-10033 03

**PROBES**

Self-calibrating remote atmospheric electromagnetic probe and data acquisition system  
M-FS-21212 B72-10665 03  
A multielement probe for coincident temperature and pressure measurements  
LEWIS-11775 B72-10716 06

**PROBLEM SOLVING**

Optimization technique for problems with an inequality constraint  
ARC-10522 B72-10222 09  
Indefinite integrals of products of some exponential and trigonometric functions  
LEWIS-11493 B72-10225 09  
Analysis and computer programs to calculate acoustic wave properties of baffled chambers  
LEWIS-11529 B72-10577 09  
Redundant data management system  
M-FS-21831 B72-10589 09  
System/360 Computer Assisted Network Scheduling (CANS) System  
GSFC-10909 B72-10599 09  
Vortex-lattice FORTRAN program for estimating subsonic aerodynamic characteristics of complex planforms  
LANGLEY-11047 B72-10618 09  
Design criteria monograph for high-load high-speed rolling-contact bearings  
LEWIS-11823 B72-10627 04  
Numerical solution of potential flow problems in terms of flux components  
M-FS-21751 B72-10667 09  
A linear programming manual  
HQ-10743 B72-10671 09

**PROCEDURES**

Standard environmental testing practices  
NPO-11567 B72-10101 02

PRODUCT DEVELOPMENT

Zipper-type electrical connectors  
NPO-11639 B72-10159 01  
Devolatilization of polymer resins  
GSFC-11358 B72-10280 04  
Graphite and boron-reinforced composite materials data summary  
M-FS-21691 B72-10294 04  
Packaging concept for LSI beam lead integrated circuits  
M-FS-21374 B72-10329 07  
Portable electron beam weld chamber  
MSC-17738 B72-10338 06  
Stem clutch for motor driven valve  
LRL-10032 B72-10345 07  
Improved universal electrical connector  
M-FS-14741 B72-10363 01  
Bondability of RTV silicon rubber  
AEC-10026 B72-10367 04  
Chuck for delicate drills  
ARC-10660 B72-10414 07  
Aluminum nitride insulating films for MOSFET devices  
NPO-11859 B72-10425 04  
High-speed, self-acting shaft seal (circumferential type)  
LEWIS-11274 B72-10447 07  
Miniature intermittent contact switch  
ARC-10450 B72-10452 01  
Ball detent mechanism  
M-FS-21735 B72-10470 07  
Interferometric measurement of the velocity of radiating particles  
HQ-10371 B72-10495 03  
No-err typing aids  
M-FS-15218 B72-10498 07  
Tandem steerable running gear  
M-FS-22012 B72-10499 07  
Thermocouple tape  
LEWIS-11072 B72-10515 04  
Advanced high-temperature electromagnetic pump  
LEWIS-11283 B72-10537 07  
Self-aligning, low-pressure sealing poppet valve  
MSC-17745 B72-10538 07  
Film holder for curved vacuum platen  
MSC-14120 B72-10542 07  
Sterile chamber operation with bio-isolator suit system  
LANGLEY-11054 B72-10547 05  
Immobilized phosphorylase for synthesis of polysaccharides from glucose  
ARC-10680 B72-10550 04  
Helium window for shock-tube monochromators  
NPO-11852 B72-10556 03  
Vise to hold bones or other irregular objects  
ARC-10679 B72-10569 07  
Self-deploying boom  
GSFC-10566 B72-10574 07  
An absentee monitoring device  
KSC-10668 B72-10578 01  
Improved silver-zinc battery-terminal seals  
LEWIS-11615 B72-10581 06  
High pressure liquid gas pump  
MSC-14087 B72-10590 06  
A transmitting and reflecting diffuser for ultraviolet light  
LANGLEY-10385 B72-10611 03  
Flexible thermal device  
M-FS-21630 B72-10612 04  
Polyimide bonded graphite fluoride: A new long life solid lubricant-coating  
LEWIS-11864 B72-10628 04

Magnetometer uses bismuth-selenide  
LEWIS-11632 B72-10629 03  
Tissue holder for experimental and Demonstration Surgery  
LEWIS-11755 B72-10630 05  
A process yields large quantities of pure ribosome subunits  
HQ-10662 B72-10653 05  
Two-speed deflection system for electron micropattern generator  
M-FS-22117 B72-10668 02  
Sprag solenoid brake  
M-FS-21846 B72-10669 06  
A shut-off valve for flexible tubing  
M-FS-21731 B72-10687 07  
Concentric-seating poppet  
NPO-11658 B72-10704 06  
Triangular wheel locomotion mechanism  
NPO-11366 B72-10714 06  
Design of microstrip components by computer  
LANGLEY-11210 B72-10741 01  
Automated analysis of blood pressure measurements (Korotkov sound)  
MSC-13999 B72-10756 05  
**PRODUCTION ENGINEERING**  
Low cost anti-galling bushings  
LEWIS-11724 B72-10359 08  
Nondestructive testing for braze voids in thin panels by use of special coatings  
LANGLEY-10486 B72-10374 08  
Fabrication techniques for organic electrolyte battery  
AEC-10019 B72-10428 08  
Efficient wire-grid duplexer-polarized for CO2 lasers  
GSFC-11403 B72-10440 03  
Built-in bleeder system in laminated plastic structures  
MSC-17713 B72-10562 08  
Precision machining of steel decahedrons  
M-FS-21361 B72-10597 07  
A four-panel enclosure protects from explosion  
M-FS-21847 B72-10613 06  
Design criteria monograph on turbopump inducers  
LEWIS-11824 B72-10635 08  
Dual field alignment display and control for electron micropattern generator  
M-FS-22118 B72-10646 01  
Two-speed deflection system for electron micropattern generator  
M-FS-22117 B72-10668 02  
**PROGRAMMED INSTRUCTION**  
Programmed physiological infusion system  
ARC-10447 B72-10126 05  
**PROGRAMMING LANGUAGES**  
GPEDIT  
GSFC-11308 B72-10620 09  
**PROJECTION**  
Optical alignment of electrodes on electrical discharge machines  
XAC-09489 B72-10036 07  
**PROJECTORS**  
Roll function in a flight simulator  
ARC-10557 B72-10417 02  
**PROLATE SPHEROIDS**  
Prolate spheroidal slosh model for fluid motion  
MSC-13864 B72-10182 09  
**PROPANE**  
Metabolic simulation chamber  
HQ-10776 B72-10658 05

PROPELLANT ADDITIVES

Suppressants for lowering propellant binder burning rate  
ARC-10563 B72-10560 04

PROPELLANT BINDERS

Suppressants for lowering propellant binder burning rate  
ARC-10563 B72-10560 04

PROPELLANT CHEMISTRY

Oxygen carrier for gas chromatographic analysis of inert gases in propellants  
ARC-10574 B72-10249 04  
Suppressants for lowering propellant binder burning rate  
ARC-10563 B72-10560 04

PROPELLANT COMBUSTION

Fluidic ignition detection  
M-FS-21498 B72-10158 06

PROPELLANT DECOMPOSITION

Propellant-powered actuator for gas generators  
ARC-10484 B72-10008 03

PROPELLANT EVAPORATION

Main tank injection pressurization program  
LEWIS-11368 B72-10069 08

PROPELLANT MASS RATIO

Rising-plate rheometer  
ARC-10524 B72-10026 03

PROPELLANT PROPERTIES

Suppressants for lowering propellant binder burning rate  
ARC-10563 B72-10560 04

PROPELLANT STORAGE

Fluidic pressure regulators  
ARC-10474 B72-10162 06  
Turbopump thermodynamic cooling  
M-FS-21597 B72-10408 06

PROPELLANT TANKS

Main tank injection pressurization program  
LEWIS-11368 B72-10069 09  
Fluidic pressure regulators  
ARC-10474 B72-10162 06  
Thermal control for storage of cryogenic propellants in a common-bulkhead tank: A concept  
ARC-10558 B72-10276 03  
Safe transport of diborane in a dual refrigerant system: A concept  
ARC-10559 B72-10277 03  
PTFE films with improved flexibility  
NPO-12028 B72-10551 04

PROPELLANT TRANSFER

Safe transport of diborane in a dual refrigerant system: A concept  
ARC-10559 B72-10277 03

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New type of trifunctional alcohol  
NPO-10714 B72-10553 04  
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MSC-14016 B72-10605 09

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- Rapid analysis of electric propulsion missions  
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### RADAR RANGE

New pulsing technique may improve radar ranging systems

ARC-10600 872-10564 02

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ARC-10600 872-10564 02

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HQ-10798 872-10662 03

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MSC-13978 872-10016 03

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GSFC-11061 872-10719 01

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ARC-10438 B72-10212 03  
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## RADIATION SHIELDING

- An empirical relationship for the penetration of 1 to 3 MeV electrons  
LEWIS-11495 B72-10144 04  
Flexible shielding system for radiation protection  
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- Radioisotope thermionic power supply for spacecraft  
ARC-10438 B72-10212 03

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NPO-11573 B72-10508 02

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- Mathematical analysis for the performance assessment of space communication parameters, IBM-360 version  
GSFC-11523 B72-10675 09

## RADIO DIRECTION FINDERS

- Radio direction finder  
NPO-11573 B72-10508 02

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- Arc protection system for high-power RF amplifiers  
NPO-11560 B72-10099 02  
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NUC-11020 B72-10228 06  
Broadband RF-distribution amplifier  
NPO-11401 B72-10245 01  
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M-FS-21924 B72-10316 01  
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GSFC-11051 B72-10462 01  
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- A panel space for RFI shielding gaskets: a concept  
MSC-17827 B72-10735 01

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- A panel space for RFI shielding gaskets: a concept  
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- Implanted telemeter for electrocardiogram and body temperature  
XAC-08505 B72-10035 05  
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- Radiological control manual  
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- Radioisotope thermionic power supply for spacecraft  
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- Nondestructive-test standards for evaluation of fiber-reinforced composites  
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AEC-10090 B72-10232 03  
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LEWIS-10965 B72-10456 04  
Neutron radiographic viewing system  
M-FS-22024 B72-10468 02

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M-FS-21693 B72-10357 02  
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ARC-10648 B72-10566 04  
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GSFC-11397 B72-10606 09

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ARC-10320 B72-10202 03

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- Spectral analysis of multiple time series  
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ARC-10447 B72-10126 05

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- Improvements of Zeyded method for calculating flutter of flat panels  
M-FS-20955 B72-10399 06  
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M-FS-18859 B72-10614 09

## RANGE (EXTREMES)

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NPO-11407 B72-10507 02

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- Lightning flash detection system  
ARC-10562 B72-10272 02

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- Boiler for generating high quality vapor  
LEWIS-11345 B72-10135 06

- Advanced high-temperature electromagnetic pump  
LEWIS-11283 B72-10537 07

## RARE GASES

- Fluidic pressure regulators  
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Oxygen carrier for gas chromatographic analysis of inert gases in propellants  
ARC-10574 B72-10249 04

- A sensitive image intensifier which uses inert gas  
LRL-10024 B72-10312 03

- Liquid methane gelled with methanol and water reduces rate of nitrogen absorption  
LEWIS-11574 B72-10330 06

- Sonic limitations and startup problems of heat pipes  
AEC-10036 B72-10368 03

- Proposed semiconductor film improvement  
HQ-10685 B72-10438 04

## RAREFIED GASES

- Metastable atom probe for measuring electron beam density profiles  
M-FS-21593 B72-10485 03

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- Quick, easy to prepare freeze-dried soups  
MSC-14003 B72-10017 05

## RATIOS

- An empirical relationship for the penetration of 1 to 3 MeV electrons  
LEWIS-11495 B72-10144 04

## RC CIRCUITS

- Low phase-shift amplifier  
NPO-11663 B72-10185 01

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- Multiple reaction mass and isolation system  
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- Chemical kinetics computer program for static and flow reactions  
LEWIS-11467 B72-10580 04  
Aerotherm chemical equilibrium (ACE) computer program  
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MSC-13604 B72-10031 05

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ARC-10329 B72-10203 05

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- Titanium alloy stress corrosion cracking in presence of dinitrogen tetroxide  
M-FS-21113 B72-10321 04

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ARC-10408 B72-10208 03

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- Programmed physiological infusion system  
ARC-10447 B72-10126 05

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- Accurate measurement of gas volumes by liquid displacement  
ARC-10723 B72-10699 03

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- Improved system for measuring speed of rotating machinery  
ARC-10413 B72-10179 07

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GSFC-11239 B72-10102 01  
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GSFC-11255 B72-10497 07

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NPO-11403 B72-10085 03

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ARC-10485 B72-10021 01

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M-FS-20915 B72-10106 01  
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LEWIS-11804 B72-10673 01

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M-FS-21326 B72-10109 02

Dual redundant core memory systems  
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The design of an automated verification  
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Ball detent mechanism  
M-FS-21735 B72-10470 07

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HQ-10709 B72-10656 09

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Automatic computer subprogram selec-  
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ALTUB  
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GSFC-11612 B72-10650 09

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MSC-17563 B72-10071 09

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ARC-10488 B72-10220 05

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Optical device for producing color line  
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ARC-10558 B72-10276 03

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ARC-10559 B72-10277 03

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Method for nonlinear exponential re-  
gression analysis  
M-FS-21965 B72-10622 09

### REGULATORS

Ball detent mechanism  
M-FS-21735 B72-10470 07

### REINFORCED PLASTICS

Built-in bleeder system in laminated  
plastic structures  
MSC-17713 B72-10562 08

### REINFORCED SHELLS

Isogrid structure  
M-FS-21567 B72-10323 06

### REINFORCEMENT (STRUCTURES)

Nondestructive-test standards for eval-  
uation of fiber-reinforced composites  
M-FS-21288 B72-10157 04

New polyimide polymer has excellent  
processing characteristics with improved  
thermo-oxidative and hydrolytic stabilities  
LEWIS-11323 B72-10175 04

Improved method for producing metal-  
reinforced ceramics  
AEC-10070 B72-10234 04

Isogrid structure  
M-FS-21567 B72-10323 06

Titanium reinforced boron polyimide  
composite  
M-FS-21916 B72-10353 04

### REINFORCING FIBERS

New polyimide polymer has excellent  
processing characteristics with improved  
thermo-oxidative and hydrolytic stabilities  
LEWIS-11323 B72-10175 04

Floating zone process for drawing small  
diameter fibers of refractory materials  
LEWIS-11380 B72-10491 04

RELEASING

Fluid operated quick release mechanism  
M-FS-20205 872-10640 07

RELIABILITY

Techniques for improving reliability of computers  
M-FS-21326 872-10109 02  
Flexible desk top computers using Large Scale Integration (L.S.I.) chips  
M-FS-21277 872-10112 01  
Guidelines for fabrication of hybrid microcircuits  
M-FS-21964 872-10393 01

RELIABILITY ANALYSIS

Reliability analysis based on operational success criteria  
ARC-10490 872-10214 09  
Leak decay method of helium bombardment leak testing  
M-FS-24109 872-10381 06  
Improved operation of rechargeable oxygen electrodes  
LEWIS-11619 872-10479 01  
A system for early warning of bearing failure  
M-FS-21877 872-10494 06  
Redundancy approaches in bubble domain memories  
M-FS-21915 872-10643 01  
Mathematical analysis for the performance assessment of space communication parameters, IBM-360 version  
GSFC-11523 872-10675 09

RELIABILITY ENGINEERING

Zipper-type electrical connectors  
NPO-11639 872-10159 01  
Mathematical techniques for estimating operational readiness of complex systems  
MSC-17694 872-10335 09  
Expandable coating cocoon leak detection system  
M-FS-21848 872-10380 06  
Specification guidelines for hybrid microcircuits  
M-FS-22090 872-10474 01  
A tool for measuring elevator cable tension  
KSC-10708 872-10509 07  
Improved silver-zinc battery-terminal seals  
LEWIS-11615 872-10581 06  
Design criteria monograph for high-load high-speed rolling-contact bearings  
LEWIS-11823 872-10627 04  
Design criteria monograph for pressurized metal cases  
LEWIS-11835 872-10633 04  
Design criteria monograph on solid rocket motor igniters  
LEWIS-11826 872-10715 06

RELIEF VALVES

Thermal control for storage of cryogenic propellants in a common-bulkhead tank: A concept  
ARC-10558 872-10276 03  
Safe transport of diborane in a dual refrigerant system: A concept  
ARC-10559 872-10277 03  
Multipurpose top for liquid helium Dewar  
ARC-10533 872-10302 03  
An economical vent cover  
M-FS-20692 872-10348 07  
High-volume pressure relief valve  
KSC-10707 872-10536 07

REMOTE CONSOLES

Video information system  
M-FS-21711 872-10267 09

REMOTE CONTROL

Rising-plate rheometer  
ARC-10524 872-10026 03  
Solenoid-operated swing-check valve  
XAC-10048 872-10037 06  
Voltage-tunable parallel-T filter for remote operation  
NPO-11165 872-10077 01  
Tornado detector and alarm  
M-FS-20915 872-10106 01  
Frequency switch keyed oscillator  
ARC-10412 872-10124 01  
Cine recording ophthalmoscope  
ARC-10399 872-10189 05  
Miniature intermittent contact switch  
ARC-10450 872-10271 01  
Remote control flare stack igniter for combustible gases  
M-FS-21675 872-10352 07  
A valve concept for remote fluid flow control  
M-FS-16097 872-10400 07  
Electromagnetic rheometer  
ARC-10525 872-10416 04  
Patient's breath controls comfort devices  
LANGLEY-11138 872-10533 05  
Dc motor proportional control system for orthotic devices  
M-FS-21573 872-10617 05  
A proposed remote manipulator system: A concept  
MSC-14245 872-10733 06

REMOTE SENSORS

Remote sensing X-ray spectrometer  
MSC-13978 872-10016 03  
Analog table look-up device identifies unknown terrain  
MSC-13816 872-10033 03  
Indexing film with a fluidic sensor  
MSC-14117 872-10501 02  
Overflow sensor for cryogenic-fluid vessels  
NPO-10619 872-10554 03  
Assessment of water pollution by airborne measurement of chlorophyll  
ARC-10648 872-10566 04  
Remote measurement of the water content of snowpacks  
ARC-10651 872-10567 03  
An absentee monitoring device  
KSC-10668 872-10578 01  
Metabolic simulation chamber  
HQ-10776 872-10658 05  
Self-calibrating remote atmospheric electromagnetic probe and data acquisition system  
M-FS-21212 872-10665 03

REMOVAL

Free-radical solution-polymerization of trifluoronitrosomethane with tetrafluoroethylene  
ARC-10567 872-10419 04  
A concept for universal pliers  
KSC-10768 872-10685 07  
Electro-chemical grinding  
LANGLEY-10801 872-10744 08  
Improved photoetching fabrication method  
LEWIS-11268 872-10745 08  
RENE 41  
Bonding titanium to Rene 41 alloy  
ARC-10311 872-10041 08

Strain gage attachment by spot welding reduces the fatigue strength of Ti-6Al-4V, Rene 41, and Inconel X  
LANGLEY-10930 872-10339 04

REPLACING

Positive fast sealing union connections  
LEWIS-11290 872-10133 06

REPORTS

Effect of thermal discharges on the mass energy balance of Lake Michigan  
AEC-10013 872-10004 03  
Titanium alloy stress corrosion cracking in presence of dinitrogen tetroxide  
M-FS-21113 872-10321 04  
Acoustic spectral analysis and testing techniques  
NPO-11554 872-10341 03

REPRESENTATIONS

Graph for locked rotor current  
MSC-15703 872-10075 06

REPRODUCTION (COPYING)

Dual field alignment display and control for electron micropattern generator  
M-FS-22118 872-10646 01

RESCUE OPERATIONS

Cylindrically shaped rope ladder  
M-FS-16319 872-10688 07

RESEARCH

Manganese bismuth thin film for large capacity digital memories  
M-FS-21246 872-10107 03

RESEARCH AND DEVELOPMENT

Research on bearing lubricants for use in a high vacuum  
M-FS-22119 872-10469 04

RESERVOIRS

Hydrophobic liquid/gas separator for heat pipes  
ARC-10656 872-10549 03

RESILIENCE

Zero-leakage valves  
ARC-10506 872-10024 06

RESINS

A method of isolating organic compounds present in water  
AEC-10010 872-10044 04  
Devolatilization of polymer resins  
GSFC-11358 872-10280 04  
An approach to real-time process control of semiconductor wire-bonding  
M-FS-21558 872-10644 08

RESISTANCE HEATING

Isotropic pyrolytic carbons  
ARC-10532 872-10029 04  
Repeatable method of thermal stress fracture test of brittle materials  
NUC-11019 872-10258 06  
A simple, efficient resistance soldering apparatus  
GSFC-10913 872-10649 08

RESISTANCE THERMOMETERS

Low temperature scale for a 1 to 20 degree Kelvin region  
AEC-10007 872-10146 03  
Simple non-destructive tests for electroexplosive devices  
NPO-11563 872-10315 01  
A compact battery powered digital thermometer  
MSC-14084 872-10545 02

RESISTORS

Beryllium thin films for resistor applications  
ARC-10485 872-10021 01  
High noise immunity one shot  
ARC-10137 872-10047 01

- Inertial reference unit  
NPO-11518 72-10094 02  
Time-adjusted variable resistor  
NPO-11306 72-10116 01  
Differential input preamplifier  
ARC-10489 72-10165 01  
Driver circuit for inductive loads  
ARC-10073 72-10268 01  
Multipurpose top for liquid helium Dewar  
ARC-10533 72-10302 03  
Temperature control of a cryogenic bath  
HQ-10788 72-10532 03
- RESOLUTION**  
Remote sensing X-ray spectrometer  
MSC-13978 72-10016 03  
Solar experiment alignment system  
ARC-10471 72-10020 03  
Low noise electromagnetic flowmeter  
M-FS-21291 72-10108 02  
Conical electromagnetic radiation flux concentrator  
M-FS-21613 72-10147 03  
Annular objective apertures improve resolution of electron microscopes  
ARC-10448 72-10171 03  
Solid state television camera has no imaging tube  
M-FS-21553 72-10254 02  
Hybrid holographic system  
M-FS-20074 72-10260 03
- RESONANCE**  
Prediction of flow-induced failures of braided flexible hoses and bellows  
M-FS-19004 72-10407 06
- RESONANT FREQUENCIES**  
Improved audio reproduction system  
ARC-10404 72-10059 01  
Microresonator for damping flow oscillations  
M-FS-18401 72-10105 06  
Frequency switch keyed oscillator  
ARC-10412 72-10124 01  
Wide-range dynamic pressure sensor  
ARC-10263 72-10196 03  
A sonic transducer to detect fluid leaks  
KSC-10704 72-10376 01  
Simple turbine balancing test apparatus  
LEWIS-11658 72-10377 07  
A system for early warning of bearing failure  
M-FS-21877 72-10494 06
- RESONANT VIBRATION**  
Microresonator for damping flow oscillations  
M-FS-18401 72-10105 06  
Wide-range dynamic pressure sensor  
ARC-10263 72-10196 03
- RESONATORS**  
Reduction of fan noise: A concept  
ARC-10312 72-10040 06  
Microresonator for damping flow oscillations  
M-FS-18401 72-10105 06  
Diatom infrared gasdynamic laser permits selection of wavelengths  
ARC-10370 72-10206 03
- RESPIRATION**  
Simple gas chromatographic system for analysis of microbial respiratory gases  
ARC-10403 72-10207 03  
Counter lung  
ARC-10248 72-10219 05
- Balanced-bellows spirometer  
XAC-01547 72-10279 05  
A continuous physiological data collector  
M-FS-20835 72-10402 05  
Electronic circuit detects left ventricular ejection events in cardiovascular system  
LEWIS-11581 72-10512 05  
Drive mechanism for production of simulated human breath  
HQ-10777 72-10659 05  
Temperature and humidity control of simulated human breath  
HQ-10778 72-10660 05  
Simulated breath waveform control  
HQ-10779 72-10661 05
- RESPIRATORY DISEASES**  
A continuous physiological data collector  
M-FS-20835 72-10402 05
- RESUSCITATION**  
Breathing-metabolic simulator  
HQ-10766 72-10657 05  
Metabolic simulation chamber  
HQ-10776 72-10658 05
- RETENTION**  
Low-friction ball-and-socket  
NPO-11348 72-10081 08
- RETICLES**  
Solar sensor with autocollimator  
ARC-10148 72-10192 03
- RETINA**  
Cine recording ophthalmoscope  
ARC-10399 72-10189 05  
Projections of scan patterns on human retina  
ARC-10181 72-10193 05  
Visual sensitivity tester  
ARC-10329 72-10203 05
- RETINAL IMAGES**  
Scanning technique for tracking small eye-movements  
ARC-10488 72-10220 05
- RETROCKET ENGINES**  
Optimized braking of landing vehicles with atmospheric drag  
NPO-11402 72-10084 06
- RETROTHRUST**  
Optimized braking of landing vehicles with atmospheric drag  
NPO-11402 72-10084 06
- REVERBERATION**  
Response of a panel structure to reverberant acoustic excitation  
M-FS-21774 72-10603 06
- REVOLVING**  
Misfit and miss-drag programs  
LANGLEY-10932 72-10153 09
- REYNOLDS NUMBER**  
Cryogenic gel flow viscometer  
ARC-10523 72-10180 03  
Reduction of noise in gyro outputs  
NPO-11603 72-10743 06
- RHEOMETERS**  
Electromagnetic rheometer  
ARC-10525 72-10416 04
- RIBBONS**  
Small-scale explosive welding of aluminum  
LANGLEY-10941 72-10002 04
- RIBOSE**  
A process yields large quantities of pure ribosome subunits  
HQ-10662 72-10653 05
- RIBS (SUPPORTS)**  
Isogrid structure  
M-FS-21567 72-10323 06
- RICCATI EQUATION**  
Variable dimension automatic synthesis programs (VASP)  
ARC-10616 72-10065 09
- RIGID STRUCTURES**  
Prolate spheroidal slosh model for fluid motion  
MSC-13864 72-10182 09
- RING STRUCTURES**  
Dispersion ring reduces injector orifice-to-orifice flow variation  
MSC-15953 72-10117 07  
Inorganic glass ceramic slip rings  
M-FS-20711 72-10313 04
- RIPPLES**  
Piezoelectric actuator uses sequentially-excited multiple elements: A concept  
NPO-11527 72-10096 01
- ROASTING**  
Plasma calcining of pigment particles for thermal control coatings  
M-FS-21267 72-10320 04  
High strength high modulus ceramic fiber  
M-FS-21266 72-10592 04
- ROCKET ENGINE CASES**  
Design criteria monograph for pressurized metal cases  
LEWIS-11835 72-10633 04
- ROCKET ENGINE DESIGN**  
Zone radiometer measurements on a model rocket exhaust plume  
M-FS-21693 72-10357 02  
Design criteria monograph for pressurized metal cases  
LEWIS-11835 72-10633 04
- ROCKET ENGINES**  
Propellant-powered actuator for gas generators  
ARC-10484 72-10008 03  
Fluidic pressure regulators  
ARC-10474 72-10162 06  
New compression molding process of thermosetting plastic compounds  
LANGLEY-10782 72-10356 08  
Fabrication of cooled, graphite-lined structures  
LEWIS-11741 72-10593 08  
Study of high altitude plume impingement  
M-FS-21414 72-10601 09  
Improved photoetching fabrication method  
LEWIS-11268 72-10745 08
- ROCKET EXHAUST**  
Zone radiometer measurements on a model rocket exhaust plume  
M-FS-21693 72-10357 02  
Study of high altitude plume impingement  
M-FS-21414 72-10601 09
- ROCKET NOZZLES**  
Gas leak-detection system  
NPO-11405 72-10087 03  
Vortex servovalve for fluidic or electrical input  
ARC-10155 72-10173 07  
New compression molding process of thermosetting plastic compounds  
LANGLEY-10782 72-10356 08
- ROCKET THRUST**  
Vortex servovalve for fluidic or electrical input  
ARC-10155 72-10173 07
- ROCKS**  
Planetary rock corer and drill concepts  
NPO-11416 72-10398 07

An improved gas extraction furnace  
MSC-14138 B72-10544 04

**RODS**  
Specimen for high-temperature tensile tests  
ARC-10531 B72-10028 04  
Squib-actuated disconnect device  
NPO-11544 B72-10097 06  
Hydraulic valve lifter remover  
M-FS-21377 B72-10110 07  
Dynamic valve to supply constant total thrust to two orifice jets  
ARC-10239 B72-10120 07  
Fabrication of uniaxial filament-reinforced epoxy tubes for structural application  
LANGLEY-10203 B72-10340 04  
Electromagnetic rheometer  
ARC-10525 B72-10416 04

**ROLL**  
Inertial reference unit  
NPO-11518 B72-10094 02  
Roll function in a flight simulator  
ARC-10557 B72-10417 02

**ROLL FORMING**  
Dispersion-strengthened chromium alloy  
LEWIS-10982 B72-10378 04

**ROLLER BEARINGS**  
Turbopump radial and axial rotor support system  
M-FS-21495 B72-10264 07  
Design criteria monograph for high-load high-speed rolling-contact bearings  
LEWIS-11823 B72-10627 04

**ROLLERS**  
Tubing cutter  
NPO-11524 B72-10095 07  
A cable stabilizer for outdoor elevators  
KSC-10513 B72-10283 07

**ROLLING MOMENTS**  
Common bearing material has highest fatigue life at moderate temperature  
LEWIS-11592 B72-10382 04

**ROOM TEMPERATURE**  
Magnetic-doped alloys with very large Seebeck coefficients  
M-FS-21410 B72-10318 04  
Strain gage attachment by spot welding reduces the fatigue strength of Ti-6Al-4V, Rene 41, and Inconel X  
LANGLEY-10930 B72-10339 04  
Adhesive for aluminum withstands cryogenic temperatures  
M-FS-16848 B72-10346 04  
High strength high modulus ceramic fiber  
M-FS-21266 B72-10592 04  
High field CdS detector for infrared radiation  
LANGLEY-11027 B72-10725 04

**ROTARY WINGS**  
Gyro spring augmentation system  
ARC-10496 B72-10010 06  
Twistable mold for helicopter blades  
ARC-10682 B72-10432 08  
Effects of nonuniform swash-plate stiffness on coupled blade-control system dynamics and stability  
LANGLEY-11068 B72-10749 06

**ROTATING BODIES**  
Position indicating, rotating boom  
LANGLEY-11202 B72-10066 07  
Gravitational gradiometer measures mass changes  
M-FS-20814 B72-10140 03

Noncontact torque measurement using stroboscopic techniques  
MSC-12282 B72-10332 07

**ROTATING DISKS**  
Angular velocity and acceleration meter  
LEWIS-11466 B72-10183 06  
A permeable rotating-wheel solvent extractor  
LRL-10033 B72-10343 04

**ROTATING ELECTRICAL MACHINES**  
Improved system for measuring speed of rotating machinery  
ARC-10413 B72-10179 07

**ROTATING MIRRORS**  
A bi-stable optical device  
HQ-10701 B72-10655 03

**ROTATING SHAFTS**  
Position indicating, rotating boom  
LANGLEY-11202 B72-10066 07  
A permeable rotating-wheel solvent extractor  
LRL-10033 B72-10343 04

**ROTATION**  
Hexapole magnet field analysis  
GSFC-10995 B72-10113 03  
Separation of gas mixtures by centrifugation  
ARC-10449 B72-10270 03  
Joining precipitation-hardened nickel-base alloys by friction welding  
LEWIS-11514 B72-10288 08  
Rotary shutter mechanism contains optical elements  
GSFC-11244 B72-10387 03

**ROTOR BLADES (TURBOMACHINERY)**  
Twistable mold for helicopter blades  
ARC-10682 B72-10432 08  
Effects of nonuniform swash-plate stiffness on coupled blade-control system dynamics and stability  
LANGLEY-11068 B72-10749 06

**ROTORS**  
Graph for locked rotor current  
MSC-15703 B72-10075 06  
Piezoelectric actuator uses sequentially-excited multiple elements: A concept  
NPO-11527 B72-10096 01  
Turbopump radial and axial rotor support system  
M-FS-21495 B72-10264 07  
Simple turbine balancing test apparatus  
LEWIS-11658 B72-10377 07  
A brushless dc spin motor for momentum exchange altitude control  
M-FS-14952 B72-10448 02

**RUBBER**  
Leaching of nitroso rubber material removes uncured polymer  
MSC-17185 B72-10449 04

**RUBBER COATINGS**  
Miniature intermittent contact switch  
ARC-10450 B72-10271 01

**RUN TIME (COMPUTERS)**  
Snap dynamics  
M-FS-21531 B72-10265 09

**RUNGE-KUTTA METHOD**  
Program to determine radiating, nonadiabatic, inviscid flow over a blunt body by the method of integral relations  
LANGLEY-11048 B72-10067 09

**RUPTURING**  
Simple method for forming thin-wall pressure vessels  
ARC-10511 B72-10025 08

**RUTHENIUM COMPOUNDS**  
Low temperature catalytic ignition of hydrogen and oxygen  
ARC-10492 B72-10127 03

**RUTILE**  
Study of in-situ degradation of thermal control surfaces  
M-FS-20892 B72-10336 04

**S**

**SAFETY**  
Standard environmental testing practices  
NPO-11567 B72-10101 02  
New meter probes provide protection from high current power sources at potentials up to 600 volts  
LANGLEY-10804 B72-10455 01  
Radiological control manual  
M-FS-22092 B72-10460 03  
Cylindrically shaped rope ladder  
M-FS-16319 B72-10688 07

**SAFETY DEVICES**  
Peak acceleration limiter  
NPO-10556 B72-10007 01  
High voltage protection network  
ARC-10197 B72-10119 02  
Radioisotope thermionic power supply for spacecraft  
ARC-10438 B72-10212 03  
Stem clutch for motor driven valve  
LRL-10032 B72-10345 07  
Combination pressure regulator and safety valve: A Concept  
MSC-14088 B72-10446 06  
Flexible shielding system for radiation protection  
LRL-10028 B72-10500 03  
A four-panel enclosure protects from explosion  
M-FS-21847 B72-10613 06  
Quick-donning backpack harness  
LANGLEY-10102 B72-10641 05  
An efficient prebreathing apparatus for humans during decompression  
MSC-14151 B72-10690 05  
Seat belt restraint system  
ARC-10519 B72-10692 06  
Waveguide switch protector  
NPO-11592 B72-10705 01

**SAFETY FACTORS**  
Technical management techniques for identification and control of industrial safety and pollution hazards  
M-FS-21883 B72-10588 05

**SAFETY MANAGEMENT**  
A four-panel enclosure protects from explosion  
M-FS-21847 B72-10613 06

**SALINITY**  
Water purification by reverse osmosis using heterocyclic polymer membranes  
LANGLEY-10514 B72-10230 04

**SALTS**  
Purification of contaminated water by filtration through porous glass  
ARC-10655 B72-10412 04  
High strength high modulus ceramic fiber  
M-FS-21266 B72-10592 04

**SAMPLERS**  
Microbiological surface sampling cart  
LANGLEY-11069 B72-10395 05

**SAMPLES**

Third order digital-to-analog converter  
MSC-12458 B72-10030 02

**SAMPLING**

Microbiological surface sampling cart  
LANGLEY-11069 B72-10395 05  
Improved sampling of compressed  
gases for condensable hydrocarbon  
content  
KSC-10304 B72-10540 06

**SANDWICH STRUCTURES**

Nondestructive testing for braze voids  
in thin panels by use of special coatings  
LANGLEY-10486 B72-10374 08

Regenerable metallic oxide systems for  
removal of carbon dioxide: A concept  
ARC-10570 B72-10420 04

Thin-film ultraviolet detector and  
spectrometer  
NPO-11432 B72-10701 03

**SAPPHIRE**

Increasing the response of PIN pho-  
todiodes to the ultraviolet  
ARC-10274 B72-10053 03  
Gate protective device for SOS array  
HQ-10745 B72-10755 01

**SATELLITE ATTITUDE CONTROL**

Wide angle solar sensor  
NPO-11341 B72-10080 01  
Gas leak-detection system  
NPO-11405 B72-10087 03

**SATELLITE ORIENTATION**

Wide angle solar sensor  
NPO-11341 B72-10080 01

**SATURN 5 LAUNCH VEHICLES**

Program to determine space vehicle  
response to wind turbulence  
M-FS-21614 B72-10410 09

**SAWS**

Cutting thin sections of bone  
ARC-10555 B72-10303 05  
A tool for cutting ultra thin slits in  
metals  
KSC-10770 B72-10433 07

**SCALING**

Wind tunnel buffet load measuring  
technique  
ARC-10495 B72-10022 06

**SCANDIUM OXIDES**

Fabrication of large ceramic electrolyte  
disks  
ARC-10320 B72-10202 03

**SCANNERS**

Optical device for producing color line  
scan display from monochrome oscil-  
loscope traces  
LANGLEY-10896 B72-10375 03  
Improved optical filters for automated  
visual inspection  
HQ-10720 B72-10521 03  
Film handling system for laser  
scanner/recorder  
MSC-14121 B72-10539 07

**SCANNING**

Scanning technique for tracking small  
eye-movements  
ARC-10488 B72-10220 05

**SCATTERING**

A Compton scatter attenuation gamma  
ray spectrometer  
M-FS-21441 B72-10487 03

**SCHEDULING**

System/360 Computer Assisted Net-  
work Scheduling (CANS) System  
GSFC-10909 B72-10599 09

**SCORING**

Lubricant selection for gear designers  
LEWIS-11483 B72-10136 04

**SCREWS**

Electrical grounding bracket  
ARC-10041 B72-10045 01

**SCRUBBERS**

Improved sampling of compressed  
gases for condensable hydrocarbon  
content  
KSC-10304 B72-10540 06

**SEALERS**

Zero-leakage valves  
ARC-10506 B72-10024 06  
Pressure-probe assembly for wind  
tunnels  
ARC-10569 B72-10248 03  
Development of a polyimide for use  
as a temperature and solvent resistant  
sealant  
M-FS-21325 B72-10262 04  
A new vibration dampening adhesive  
MSC-17668 B72-10284 04  
Synthesis of temperature and solvent-  
resistant polymers  
M-FS-20848 B72-10342 04  
Thermally resistant polymers for fuel  
tank sealants  
M-FS-21232 B72-10358 04

**SEALING**

Glass technology involved in the manu-  
facture of magnetometer components  
GSFC-11283 B72-10132 03

**SEALS (STOPPERS)**

Hermetic isolation valves  
ARC-10505 B72-10013 06  
Micro regulating ball valve  
ARC-10295 B72-10121 06  
Optical shutter for use in shock tubes  
ARC-10516 B72-10128 03  
High-temperature ceramic-to-ceramic  
seals  
ARC-10319 B72-10199 04  
Laboratory leak tester provides high  
sensitivity  
AEC-10042 B72-10240 03  
Turbopump radial and axial rotor sup-  
port system  
M-FS-21495 B72-10264 07  
Inorganic glass ceramic slip rings  
M-FS-20711 B72-10313 04  
High-volume pressure relief valve  
KSC-10707 B72-10536 07

**SEAT BELTS**

Seat belt restraint system  
ARC-10519 B72-10692 06

**SEATS**

Micro regulating ball valve  
ARC-10295 B72-10121 06

**SEDIMENTS**

Phosphorus in land-water systems  
AEC-10049 B72-10429 05

**SEEBECK EFFECT**

Compensation of voltage drops in  
solid-state switches used with thermoelec-  
tric generators  
NPO-11388 B72-10138 01  
Magnetic-doped alloys with very large  
Seebeck coefficients  
M-FS-21410 B72-10318 04

**SEGMENTS**

Compensating subreflector for two-  
reflector antennas: A concept  
NPO-11503 B72-10093 06

**SELENIDES**

Magnetometer uses bismuth-selenide  
LEWIS-11632 B72-10629 03

**SELF ERECTING DEVICES**

Self-deploying boom  
GSFC-10566 B72-10574 07

**SELF LUBRICATION**

Potentiometer, constant tension and  
lubrication device  
KSC-10723 B72-10541 02

**SELF SEALING**

Fill and vent quick disconnect  
M-FS-21822 B72-10645 07

**SEMICONDUCTING FILMS**

Gate protective device for insulated gate  
field-effect transistors  
M-FS-21626 B72-10149 01  
Annular objective apertures improve  
resolution of electron microscopes  
ARC-10448 B72-10171 03  
Proposed semiconductor film  
improvement  
HQ-10685 B72-10438 04

**SEMICONDUCTOR DEVICES**

Oxygen pressure control for electrolysis  
cells  
ARC-10250 B72-10074 02  
Compensation of voltage drops in  
solid-state switches used with thermoelec-  
tric generators  
NPO-11388 B72-10138 01  
Simple dynamic electromagnetic radia-  
tion detector  
LEWIS-11159 B72-10227 03  
Proposed semiconductor film  
improvement  
HQ-10685 B72-10438 04  
A Compton scatter attenuation gamma  
ray spectrometer  
M-FS-21441 B72-10487 03  
An approach to real-time process  
control of semiconductor wire-bonding  
M-FS-21558 B72-10644 08  
High temperature gallium phosphide  
rectifiers  
LEWIS-11804 B72-10673 01  
Insulated-gate field-effect transistor  
strain sensor  
LANGLEY-11012 B72-10731 01  
Wideband wattmeter for instant mea-  
surement of real power  
LEWIS-11698 B72-10737 01

**SEMICONDUCTORS (MATERIALS)**

Gate protective device for insulated gate  
field-effect transistors  
M-FS-21626 B72-10149 01  
Study of in-situ degradation of thermal  
control surfaces  
M-FS-20892 B72-10336 04  
Overlap diffusion for increasing photo-  
transistor dynamic range  
M-FS-20407 B72-10347 01  
Redundancy approaches in bubble  
domain memories  
M-FS-21915 B72-10643 01

**SENSITIVITY**

Improved laboratory gradiometer can  
be a field survey instrument  
MSC-13980 B72-10001 03  
Remote sensing X-ray spectrometer  
MSC-13978 B72-10016 03  
Determination of impact sensitivity of  
materials at high pressures  
MSC-13700 B72-10216 07  
Simple dynamic electromagnetic radia-  
tion detector  
LEWIS-11159 B72-10227 03  
Improved intensifying screen reduces  
X-ray exposure  
AEC-10090 B72-10232 03

- Laboratory leak tester provides high sensitivity  
AEC-10042 B72-10240 03  
Helium leak measurements using CO<sub>2</sub> as a carrier  
M-FS-21742 B72-10354 03  
Compensator design for low-sensitivity linear time-invariant systems (COMPDES)  
M-FS-21652 B72-10486 09  
An absorption spectrum amplifier for determining gas composition  
HQ-10752 B72-10524 03
- SENSITIZING**  
Erasable holographic medium using cis-trans isomerization  
M-FS-22062 B72-10720 03
- SENSORIMOTOR PERFORMANCE**  
New reaction tester accurate within 56 microseconds  
MSC-13604 B72-10031 05
- SENSORS**  
Position indicating, rotating boom  
LANGLEY-11202 B72-10066 07  
A reliable liquid helium detector  
LEWIS-11487 B72-10145 01  
Vibrating ribbon bolometer: A concept  
XAC-10768 B72-10170 03
- SEPARATED FLOW**  
Cavitation data for hydraulic equipment  
LEWIS-11642 B72-10384 07
- SEPARATION**  
A method of isolating organic compounds present in water  
AEC-10010 B72-10044 04
- SEPARATORS**  
Mass separator for low velocity ions  
ARC-10375 B72-10123 03  
Separation of gas mixtures by centrifugation  
ARC-10449 B72-10270 03  
Hydrophobic liquid/gas separator for heat pipes  
ARC-10656 B72-10549 03
- SEQUENTIAL CONTROL**  
Piezoelectric actuator uses sequentially-excited multiple elements: A concept  
NPO-11527 B72-10096 01  
Flexible desk top computers using Large Scale Integration (L.S.I.) chips  
M-FS-21277 B72-10112 01
- SERVICE LIFE**  
High-temperature, long-life thyratron  
LEWIS-11327 B72-10134 01  
Improved operation of rechargeable oxygen electrodes  
LEWIS-11619 B72-10479 01  
Advanced alloy design technique: High temperature cobalt base superalloy  
LEWIS-10436 B72-10514 04  
Micro-scale crease-and-fold apparatus  
NPO-12029 B72-10552 06
- SERVOCONTROL**  
Control of acceleration in sine/random vibration tests  
NPO-11482 B72-10091 02  
Particle detection by a light-scattering technique  
ARC-10384 B72-10160 03  
Vortex servovalve for fluidic or electrical input  
ARC-10155 B72-10173 07
- SERVO MECHANISMS**  
Wind tunnel buffet load measuring technique  
ARC-10495 B72-10022 06
- SERVOMOTORS**  
Vibrating ribbon bolometer: A concept  
XAC-10768 B72-10170 03  
Film handling system for laser scanner/recorder  
MSC-14121 B72-10539 07
- SET THEORY**  
Cubic spline functions for curve fitting  
LRL-10034 B72-10311 09  
A linear programming manual  
HQ-10743 B72-10671 09
- SEWAGE**  
Metered oxygen supply aids treatment of domestic sewage  
ARC-10024 B72-10557 05
- SHAFTS (MACHINE ELEMENTS)**  
High speed, self-acting, face-contact shaft seal has low leakage and very low wear  
LEWIS-11598 B72-10114 07  
Micro regulating ball valve  
ARC-10295 B72-10121 06  
Angular velocity and acceleration meter  
LEWIS-11466 B72-10183 06  
Low cost anti-galling bushings  
LEWIS-11724 B72-10359 08  
High-speed, self-acting shaft seal (circumferential type)  
LEWIS-11274 B72-10447 07  
Adjustable locking device  
M-FS-21650 B72-10459 07  
Computer program for calculating the temperature field of face seals  
LEWIS-11110 B72-10483 09  
Sprag solenoid brake  
M-FS-21846 B72-10669 06  
Improved lip seal for rotating shafts  
LEWIS-11602 B72-10672 07
- SHAKERS**  
Control of acceleration in sine/random vibration tests  
NPO-11482 B72-10091 02
- SHEAR PROPERTIES**  
Rising-plate rheometer  
ARC-10524 B72-10026 03
- SHEAR STRENGTH**  
Small-scale explosive welding of aluminum  
LANGLEY-10941 B72-10002 04  
A new vibration dampening adhesive  
MSC-17668 B72-10284 04  
Graphite and boron-reinforced composite materials data summary  
M-FS-21691 B72-10294 04  
Adhesive for aluminum withstands cryogenic temperatures  
M-FS-16848 B72-10346 04
- SHEAR STRESS**  
Bonding titanium to Rene 41 alloy  
ARC-10311 B72-10041 08  
Cryogenic gel flow viscometer  
ARC-10523 B72-10180 03  
Angular velocity and acceleration meter  
LEWIS-11466 B72-10183 06
- SHEATHS**  
Explosive cord  
M-FS-21928 B72-10293 08
- SHELLS (STRUCTURAL FORMS)**  
Isogrid structure  
M-FS-21567 B72-10323 06  
Geometrically nonlinear static and dynamic analysis of arbitrarily loaded shells of revolution  
LANGLEY-11109 B72-10504 09
- SHIELDING**  
Small-scale explosive welding of aluminum  
LANGLEY-10941 B72-10002 04  
Electrical grounding bracket  
ARC-10041 B72-10045 01  
Baffle to confine glow discharge in ion pump  
M-FS-21575 B72-10324 03  
A four-panel enclosure protects from explosion  
M-FS-21847 B72-10613 06  
Boron-10 loaded inorganic shielding material  
M-FS-22280 B72-10740 04
- SHIFT REGISTERS**  
Techniques for improving reliability of computers  
M-FS-21326 B72-10109 02  
Improved feedback shift register  
NPO-10351 B72-10226 01  
A manually set magnetic wire counter  
AEC-10039 B72-10369 01  
An improved learning decoder  
MSC-14070 B72-10573 02  
A simplified, compact static shift register  
HQ-10723 B72-10591 02  
Redundancy approaches in bubble domain memories  
M-FS-21915 B72-10643 01
- SHOCK HEATING**  
Controlled flow assembly  
M-FS-21716 B72-10404 07
- SHOCK LAYERS**  
Program to determine radiating, nonadiabatic, inviscid flow over a blunt body by the method of integral relations  
LANGLEY-11048 B72-10067 09
- SHOCK RESISTANCE**  
Isotropic pyrolytic carbons  
ARC-10532 B72-10029 04  
Miniature intermittent contact switch  
ARC-10450 B72-10271 01
- SHOCK TUBES**  
Optical shutter for use in shock tubes  
ARC-10516 B72-10128 03  
Improved high-performance shock tube  
NPO-11885 B72-10242 03  
Amplifier for signal from thin film transducer  
LEWIS-11494 B72-10463 01
- SHOCK WAVE ATTENUATION**  
Improved high-performance shock tube  
NPO-11885 B72-10242 03
- SHOCK WAVE GENERATORS**  
Wind tunnel buffet load measuring technique  
ARC-10495 B72-10022 06
- SHOCK WAVES**  
Optical shutter for use in shock tubes  
ARC-10516 B72-10128 03  
Explosive cord  
M-FS-21928 B72-10293 08  
Chemical kinetics computer program for static and flow reactions  
LEWIS-11467 B72-10580 04  
Study of high altitude plume impingement  
M-FS-21414 B72-10601 09
- SHORT CIRCUITS**  
Sheet plastic filters for solar cells  
NPO-11464 B72-10090 04  
New meter probes provide protection from high current power sources at potentials up to 600 volts  
LANGLEY-10804 B72-10455 01

**SHORT TAKEOFF AIRCRAFT**

Ejector nozzle with massive blowing  
ARC-10621 B72-10693 06

**SHOULDERS**

Quick-donning backpack harness  
LANGLEY-10102 B72-10641 05

**SHRINKAGE**

High strength, medium density molded foam  
AEC-10053 B72-10235 04  
Fabrication of uniaxial filament-reinforced epoxy tubes for structural application  
LANGLEY-10203 B72-10340 04  
Low cost anti-galling bushings  
LEWIS-11724 B72-10359 08

**SHROUDS**

Reduction of noise in gyro outputs  
NPO-11603 B72-10743 06

**SHUTTERS**

Optical shutter for use in shock tubes  
ARC-10516 B72-10128 03  
Rotary shutter mechanism contains optical elements  
GSFC-11244 B72-10387 03

**SIDEBANDS**

Accurate measurement of telemetry performance  
NPO-11457 B72-10089 02

**SIDELOBES**

Redirecting electromagnetic beams through wide angles  
ARC-10602 B72-10307 03

**SIGNAL ANALYSIS**

A study of the power spectral density of an FM signal  
M-FS-21070 B72-10361 02

**SIGNAL ANALYZERS**

A range expanding signal conditioner  
M-FS-21720 B72-10639 02

**SIGNAL DETECTION**

Technique minimizes the effects of dropouts on telemetry records  
NPO-11421 B72-10088 02  
Optical enhancement of sensitivity in laser Doppler velocity systems  
ARC-10653 B72-10310 03  
A range expanding signal conditioner  
M-FS-21720 B72-10639 02

**SIGNAL ENCODING**

Dual redundant core memory systems  
MSC-13993 B72-10261 09  
Speech therapy and voice recognition instrument  
HQ-10628 B72-10652 05

**SIGNAL FADING**

An improved learning decoder  
MSC-14070 B72-10573 02

**SIGNAL GENERATORS**

Differential input preamplifier  
ARC-10489 B72-10165 01  
Nondestructive testing of microtab welds  
ARC-10176 B72-10296 02

**SIGNAL PROCESSING**

Technique minimizes the effects of dropouts on telemetry records  
NPO-11421 B72-10088 02  
Dual redundant core memory systems  
MSC-13993 B72-10261 09  
A simple dead-reckoning navigational system  
M-FS-21165 B72-10409 02  
Very high speed direct-readout, control and recording system  
M-FS-20658 B72-10442 02

Radio direction finder  
NPO-11573 B72-10508 02  
Remote measurement of the water content of snowpacks  
ARC-10651 B72-10567 03  
A range expanding signal conditioner  
M-FS-21720 B72-10639 02  
Low distortion automatic phase control circuit  
M-FS-21671 B72-10682 02

**SIGNAL RECEPTION**

Lightning flash detection system  
ARC-10562 B72-10272 02  
Very high speed direct-readout, control and recording system  
M-FS-20658 B72-10442 02  
Remote measurement of the water content of snowpacks  
ARC-10651 B72-10567 03

**SIGNAL STABILIZATION**

Broadband RF-distribution amplifier  
NPO-11401 B72-10245 01  
A study of the power spectral density of an FM signal  
M-FS-21070 B72-10361 02

**SIGNAL TO NOISE RATIOS**

Pulse excitation of bolometer bridges  
ARC-10292 B72-10054 01  
Accurate measurement of telemetry performance  
NPO-11457 B72-10089 02  
Signal to noise measurement circuit  
GSFC-11239 B72-10102 01  
Manganese bismuth thin film for large capacity digital memories  
M-FS-21246 B72-10107 03  
An improved learning decoder  
MSC-14070 B72-10573 02  
A range expanding signal conditioner  
M-FS-21720 B72-10639 02  
Reduction of noise in gyro outputs  
NPO-11603 B72-10743 06

**SIGNAL TRANSMISSION**

Heart catheter cable and connector  
ARC-10406 B72-10200 05  
Lightning flash detection system  
ARC-10562 B72-10272 02  
Blood pressure measurement and display system  
MSC-13036 B72-10334 05

**SIGNALS**

Amplifier for signal from thin film transducer  
LEWIS-11494 B72-10463 01  
Universal dc signal conditioner  
MSC-17526 B72-10510 02

**SILANES**

Nonflammable and abrasion resistant coating process for glass fibers  
MSC-14024 B72-10445 08

**SILICATES**

Research on bearing lubricants for use in a high vacuum  
M-FS-22119 B72-10469 04  
A visual-display and storage device  
GSFC-10901 B72-10647 02

**SILICON**

Oxygen-layer structure improves lithium-doped silicon solar cells  
NPO-11403 B72-10085 03  
Introduction of lithium into the front surface of solar cells  
NPO-11404 B72-10086 02  
Tornado detector and alarm  
M-FS-20915 B72-10106 01

Long-term drift of thermocouples at 1600 K  
LEWIS-11471 B72-10176 01  
Simple dynamic electromagnetic radiation detector  
LEWIS-11159 B72-10227 03  
Devolatilization of polymer resins  
GSFC-11358 B72-10280 04  
Microminiature gas chromatographic column  
ARC-10594 B72-10306 04  
Failure in glass  
AEC-10088 B72-10364 04  
Efficient wire-grid duplexer-polarized for CO2 lasers  
GSFC-11403 B72-10440 03  
High intensity solar cell radiometer  
LEWIS-11549 B72-10480 01  
Humidity resistant solar cell contacts  
HQ-10674 B72-10517 04

**SILICON CARBIDES**

Control of acceleration in sine/random vibration tests  
NPO-11482 B72-10091 02  
**SILICON CONTROLLED RECTIFIERS**  
Time-lapse camera for microscopy  
ARC-10423 B72-10125 05  
Automatic method of measuring silicon-controlled-rectifier holding current  
LEWIS-11898 B72-10752 02

**SILICON DIOXIDE**

Improved elastomer for use with oxygen difluoride  
ARC-10528 B72-10027 04  
Optical bonding agents for severe environments  
ARC-10459 B72-10063 04  
Cell for electrolysis of water vapor  
ARC-10521 B72-10166 03  
Insolubilized enzymes for food synthesis  
ARC-10568 B72-10247 04  
A transmitting and reflecting diffuser for ultraviolet light  
LANGLEY-10385 B72-10611 03  
Development of chip passivated monolithic complementary MISFET circuits with beam leads  
M-FS-22264 B72-10696 01

**SILICON OXIDES**

Gate protective device for SOS array  
HQ-10745 B72-10755 01

**SILICON RADIATION DETECTORS**

Gas leak-detection system  
NPO-11405 B72-10087 03

**SILICON TRANSISTORS**

Coaxial inverted geometry epitaxial transistor  
ARC-10330 B72-10056 01

**SILICONE RUBBER**

Protective encapsulation of implantable biotelemetry units  
ARC-10514 B72-10301 05  
Ultrasonic bone densitometer  
M-FS-20994 B72-10450 05  
Improved biomedical electrode  
MSC-13648 B72-10642 05  
Implantable drug therapy device: A concept  
NPO-11934 B72-10708 05

**SILICONES**

Synthesis of temperature and solvent-resistant polymers  
M-FS-20848 B72-10342 04  
Bondability of RTV silicon rubber  
AEC-10026 B72-10367 04



**SILICONIZING**

Nonflammable and abrasion resistant coating process for glass fibers  
MSC-14024 B72-10445 08

**SILOXANES**

Improved method for reclaiming vacuum diffusion pump oil  
LEWIS-11647 B72-10511 04  
Ultraviolet and thermally stable polymer compositions  
ARC-10592 B72-10709 04

**SILVER**

Soldering iron temperature indicator  
NPO-11545 B72-10098 02  
Carbon dioxide concentrator  
ARC-10245 B72-10194 05  
Pressure-probe assembly for wind tunnels  
ARC-10569 B72-10248 03  
Explosive cord  
M-FS-21928 B72-10293 08  
Laser beam deflection control: A concept  
MSC-13814 B72-10411 02  
Silver stain for electron microscopy  
ARC-10661 B72-10415 05  
Improved photoetching fabrication method  
LEWIS-11268 B72-10745 08

**SILVER CHLORIDES**

Silver-chlorine fuel cell: A concept  
ARC-10491 B72-10221 03  
Fabrication techniques for organic electrolyte battery  
AEC-10019 B72-10428 08

**SILVER COMPOUNDS**

Aluminum foil interconnects for solar cell panels  
ARC-10374 B72-10058 08

**SIMULATION**

Soldering iron temperature indicator  
NPO-11545 B72-10098 02  
Prolate spheroidal slosh model for fluid motion  
MSC-13864 B72-10182 09  
Speed enhancement of complementary MOS devices  
ARC-10387 B72-10184 01  
Drive mechanism for production of simulated human breath  
HQ-10777 B72-10659 05  
Temperature and humidity control of simulated human breath  
HQ-10778 B72-10660 05  
Simulated breath waveform control  
HQ-10779 B72-10661 05

**SIMULATORS**

Urban air pollution dispersion model  
AEC-10004 B72-10003 03  
Weight simulator  
ARC-10100 B72-10046 05  
Heart simulator  
M-FS-21609 B72-10131 02  
A compact spectroradiometer for solar simulator measurements  
HQ-10683 B72-10327 03  
Breathing-metabolic simulator  
HQ-10766 B72-10657 05  
Metabolic simulation chamber  
HQ-10776 B72-10658 05

**SINE SERIES**

Three-point compound sine plate offers cost and weight savings  
MSC-15818 B72-10118 07

**SINE WAVES**

Implanted telemeter for electrocardiogram and body temperature  
XAC-08505 B72-10035 05  
Control of acceleration in sine/random vibration tests  
NPO-11482 B72-10091 02  
Dynamic valve to supply constant total thrust to two orifice jets  
ARC-10239 B72-10120 07  
Nondestructive testing of microtab welds  
ARC-10176 B72-10296 02

**SINGLE CRYSTALS**

Advanced infrared photomultiplier  
M-FS-20941 B72-10152 03  
Floating zone process for drawing small diameter fibers of refractory materials  
LEWIS-11380 B72-10491 04  
Polishing is made cheaper by disposable diamond-impregnated abrasive cloth  
MSC-14247 B72-10616 08

**SINTERING**

Fabrication of large ceramic electrolyte disks  
ARC-10320 B72-10202 03  
Nonflammable and abrasion resistant coating process for glass fibers  
MSC-14024 B72-10445 08  
Humidity resistant solar cell contacts  
HQ-10674 B72-10517 04  
Sintered diamond compacts using metallic cobalt binders  
HQ-10706 B72-10519 04

**SIZING (SHAPING)**

Low cost anti-galling bushings  
LEWIS-11724 B72-10359 08

**SKIN (ANATOMY)**

An improved aesthesiometer  
MSC-13609 B72-10032 05  
Improved biomedical electrode  
MSC-13648 B72-10642 05  
Improved electrodes for skin contacts  
M-FS-21926 B72-10698 05

**SKIN TEMPERATURE (BIOLOGY)**

Improved temperature control of liquid cooling garments  
MSC-13917 B72-10281 05

**SLEEVES**

An improved aesthesiometer  
MSC-13609 B72-10032 05  
Combination throttle and shutoff valve  
M-FS-21513 B72-10287 07  
Fabrication of uniaxial filament-reinforced epoxy tubes for structural application  
LANGLEY-10203 B72-10340 04  
Perload indicating turnbuckle  
M-FS-21488 B72-10355 07  
Low cost anti-galling bushings  
LEWIS-11724 B72-10359 08  
Rotary shutter mechanism contains optical elements  
GSFC-11244 B72-10387 03

**SLIDING FRICTION**

Longitudinal friction forces in piping design  
M-FS-13754 B72-10103 01

**SLITS**

Optical shutter for use in shock tubes  
ARC-10516 B72-10128 03  
A tool for cutting ultra thin slits in metals  
KSC-10770 B72-10433 07  
Improved optical filters for automated visual inspection  
HQ-10720 B72-10521 03

**SLOPES**

Triangular wheel locomotion mechanism  
NPO-11366 B72-10714 06

**SLURRIES**

Electrodes for sealed secondary batteries  
ARC-10238 B72-10050 02  
Silver-chlorine fuel cell: A concept  
ARC-10491 B72-10221 03

**SMOKE ABATEMENT**

Urban air pollution dispersion model  
AEC-10004 B72-10003 03

**SNELLS LAW**

An improved apochromatic wedge utilizing optical molecular contact bonding  
GSFC-11082 B72-10388 03

**SNOW COVER**

Remote measurement of the water content of snowpacks  
ARC-10651 B72-10567 03

**SOAKING**

Fabrication of large ceramic electrolyte disks  
ARC-10320 B72-10202 03

**SODALITE**

A visual-display and storage device  
GSFC-10901 B72-10647 02

**SODIUM CHLORIDES**

Al/Cl<sub>2</sub> molten salt battery  
HQ-10696 B72-10527 01  
Reverse-osmosis membranes by plasma polymerization  
ARC-10696 B72-10710 04

**SODIUM COMPOUNDS**

Covalent bonding of antibodies of polystyrene latex beads: A concept  
MSC-13906 B72-10006 05  
Catalyst for sodium chlorate decomposition  
ARC-10584 B72-10305 04  
Radiation-induced nickel deposits  
LEWIS-10965 B72-10456 04

**SODIUM SALICYLATES**

Improved transmittance measurement with a magnesium oxide coated integrating sphere  
LEWIS-11840 B72-10717 04

**SODIUM SILICATES**

Inorganic glass ceramic slip rings  
M-FS-20711 B72-10313 04

**SOFT LANDING**

Optimized braking of landing vehicles with atmospheric drag  
NPO-11402 B72-10084 06

**SOILS**

Phosphorus in land-water systems  
AEC-10049 B72-10429 05

**SOLAR ACTIVITY**

Sunspot analysis and prediction  
M-FS-21724 B72-10317 03

**SOLAR ARRAYS**

Performance of silicon solar cell assemblies  
NPO-11847 B72-10186 01

**SOLAR CELLS**

Aluminum foil interconnects for solar cell panels  
ARC-10374 B72-10058 08  
Wide angle solar sensor  
NPO-11341 B72-10080 01  
Oxygen-layer structure improves lithium-doped silicon solar cells  
NPO-11403 B72-10085 03

- Introduction of lithium into the front surface of solar cells  
NPO-11404 B72-10086 02
- Sheet plastic filters for solar cells  
NPO-11464 B72-10090 04
- High solar intensity radiometer  
LEWIS-11533 B72-10130 03
- Flexible, low-cost silicon solar cell arrays  
LEWIS-11069 B72-10177 02
- Performance of silicon solar cell assemblies  
NPO-11847 B72-10186 01
- Solar sensor with autocollimator  
ARC-10148 B72-10192 03
- High intensity solar cell radiometer  
LEWIS-11549 B72-10480 01
- Humidity resistant solar cell contacts  
HQ-10674 B72-10517 04
- Peak-power-point monitor for solar panel  
NPO-11708 B72-10694 02
- SOLAR COLLECTORS**  
Wide angle solar sensor  
NPO-11341 B72-10080 01
- Solar powered absorption cycle heat pump using phase change materials for energy storage  
M-FS-21927 B72-10615 06
- SOLAR CONSTANT**  
High solar intensity radiometer  
LEWIS-11533 B72-10130 03
- SOLAR ENERGY**  
Solar powered absorption cycle heat pump using phase change materials for energy storage  
M-FS-21927 B72-10615 06
- SOLAR GENERATORS**  
Peak-power-point monitor for solar panel  
NPO-11708 B72-10694 02
- SOLAR HEATING**  
Phosphonium chloride for thermal storage  
ARC-10572 B72-10422 04
- Solar powered absorption cycle heat pump using phase change materials for energy storage  
M-FS-21927 B72-10615 06
- SOLAR PHYSICS**  
Solar experiment alignment system  
ARC-10471 B72-10020 03
- SOLAR RADIATION**  
Increasing the response of PIN photodiodes to the ultraviolet  
ARC-10274 B72-10053 03
- Program for determination of radiation interchange factors  
MSC-17563 B72-10071 09
- Sheet plastic filters for solar cells  
NPO-11464 B72-10090 04
- A compact spectroradiometer for solar simulator measurements  
HQ-10683 B72-10327 03
- Investigation of environmental effects on coatings for thermal control  
M-FS-21932 B72-10596 04
- A study of radiation environment in space and its biological effects  
HQ-10798 B72-10662 03
- Ultraviolet and thermally stable polymer compositions  
ARC-10592 B72-10709 04
- SOLAR SENSORS**  
Solar experiment alignment system  
ARC-10471 B72-10020 03
- Solar sensor with autocollimator  
ARC-10148 B72-10192 03
- SOLAR SYSTEM**  
Gravitational gradiometer measures mass changes  
M-FS-20814 B72-10140 03
- SOLAR WIND**  
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 Sterile chamber operation with bio-isolator suit system  
 LANGLEY-11054 872-10547 05

**TEST EQUIPMENT**  
 Peak acceleration limiter  
 NPO-10556 872-10007 01  
 Software control for large scale on-board checkout: A concept  
 MSC-13977 872-10015 09  
 Visual sensitivity tester  
 ARC-10329 872-10203 05  
 Quartz crystal microbalance use in biological studies  
 NPO-11346 872-10243 05  
 Oxygen carrier for gas chromatographic analysis of inert gases in propellants  
 ARC-10574 872-10249 04  
 Flow equation for porous plug and capillary tube flow restrictors  
 GSFC-11387 872-10289 06  
 Nondestructive testing of microtab welds  
 ARC-10176 872-10296 02  
 A simple tachometer circuit  
 ARC-10603 872-10308 01  
 Remote weighing device  
 M-FS-21556 872-10325 07  
 Small turbine-type flowmeters for liquid hydrogen  
 LEWIS-11535 872-10331 06  
 Simple turbine balancing test apparatus  
 LEWIS-11658 872-10377 07  
 Expandable coating cocoon leak detection system  
 M-FS-21848 872-10380 06  
 Two-axis leveling detector system  
 M-FS-21344 872-10392 02  
 Rapid evaluation of reverse-osmosis membranes  
 ARC-10659 872-10413 04  
 Technique for increasing yield of trifluoronitrosomethane-tetrafluoroethylene lymer lymer  
 ARC-10566 872-10418 04  
 Multiple reaction mass and isolation system  
 M-FS-24119 872-10441 06  
 High temperature permeameter for measuring magnetic properties  
 LEWIS-11609 872-10443 03  
 New meter probes provide protection from high current power sources at potentials up to 600 volts  
 LANGLEY-10804 872-10455 01  
 Constant tension device for gravity simulation  
 M-FS-21618 872-10466 06  
 A system for early warning of bearing failure  
 M-FS-21877 872-10494 06  
 Magnetic circuitry mutual coupling probe  
 M-FS-21664 872-10535 02  
 Micro-scale crease-and-fold apparatus  
 NPO-12029 872-10552 06  
 Helium window for shock-tube monochromators  
 NPO-11852 872-10556 03  
 Oxygen plasmas used to synthesize superoxides  
 ARC-10686 872-10570 04  
 Laser mass spectrometer  
 ARC-10687 872-10571 03

Oscillation of laser-beam intensity as observed with beam splitters  
 ARC-10694 872-10572 03  
 Leak test system  
 M-FS-21788 872-10576 06  
 A transmitting and reflecting diffuser for ultraviolet light  
 LANGLEY-10385 872-10611 03  
 Polyimide bonded graphite fluoride: A new long life solid lubricant coating  
 LEWIS-11864 872-10628 04  
 Magnetometer uses bismuth-selenide  
 LEWIS-11632 872-10629 03  
 Use of small turbine-type flowmeters to measure flow in large pipes  
 LEWIS-11851 872-10631 06  
 A monostrain test apparatus  
 M-FS-24221 872-10679 06  
 New detection method for rolling element and bearing defects  
 M-FS-21911 872-10689 06  
 Improved ultrasonic biomedical measuring apparatus  
 ARC-10597 872-10695 05  
 Automatic method of measuring silicon-controlled-rectifier holding current  
 LEWIS-11898 872-10752 02

**TEST FACILITIES**  
 Velocity accelerator for particles  
 NPO-11349 872-10082 03  
 Standard environmental testing practices  
 NPO-11567 872-10101 02  
 Pressure-probe assembly for wind tunnels  
 ARC-10569 872-10248 03  
 Balanced-bellows spirometer  
 XAC-01547 872-10279 05  
 Right angle mounted cold trap  
 GSFC-11323 872-10436 06

**TETRABUTYLS**  
 Initiation of polymerization by tetrabutylammonium p-lithiophenoxide  
 ARC-10553 872-10223 04

**THALLIUM**  
 High-temperature, long-life thyatron  
 LEWIS-11327 872-10134 01

**THEODOLITES**  
 A simple dead-reckoning navigational system  
 M-FS-21165 872-10409 02

**THEORETICAL PHYSICS**  
 Improvements of Zeyded method for calculating flutter of flat panels  
 M-FS-20955 872-10399 06

**THERAPY**  
 New reaction tester accurate within 56 microseconds  
 MSC-13604 872-10031 05  
 Weight simulator  
 ARC-10100 872-10046 05

**THERMAL CONDUCTIVITY**  
 Method of determining thermal conductivity in multi-layer insulation systems  
 M-FS-20213 872-10154 03  
 Sonic limitations and startup problems of heat pipes  
 AEC-10036 872-10368 03

**THERMAL CONDUCTORS**  
 An electrohydrodynamic heat pipe  
 ARC-10601 872-10251 03  
 Overflow sensor for cryogenic-fluid vessels  
 NPO-10619 872-10554 03

**THERMAL CONTROL COATINGS**

High voltage electrical insulation coating for refractory materials  
 LEWIS-11479 872-10290 04  
 Plasma calcining of pigment particles for thermal control coatings  
 M-FS-21267 872-10320 04  
 Improved magnesia for thermal control coatings  
 ARC-10677 872-10424 04  
 Investigation of environmental effects on coatings for thermal control  
 M-FS-21932 872-10596 04  
 Improved zinc oxide thermal control coatings  
 NPO-11139 872-10711 04

**THERMAL DIFFUSION**

Aluminum foil interconnects for solar cell panels  
 ARC-10374 872-10058 08

**THERMAL DISSOCIATION**

Catalyst for sodium chlorate decomposition  
 ARC-10584 872-10305 04

**THERMAL ENERGY**

Closed-cycle power supply for fluidic control systems  
 ARC-10480 872-10163 06  
 Differential input preamplifier  
 ARC-10489 872-10165 01  
 New compression molding process of thermosetting plastic compounds  
 LANGLEY-10782 872-10356 08

**THERMAL EXPANSION**

Hermetic isolation valves  
 ARC-10505 872-10013 06  
 Universal inverted flexure  
 ARC-10345 872-10122 07  
 Wide-range dynamic pressure sensor  
 ARC-10263 872-10196 03  
 High-temperature ceramic-to-ceramic seals  
 ARC-10319 872-10199 04  
 Thermal analog device reduces machining errors  
 AEC-10080 872-102237 08  
 Thermally stable structural framework  
 ARC-10612 872-10252 08  
 Titanium reinforced boron polyimide composite  
 M-FS-21916 872-10353 04  
 Watertight low-cost electrical connector  
 LEWIS-11552 872-10506 01  
 Mechanically and thermally stable maser cavity resonator  
 HQ-10790 872-10523 01

**THERMAL INSULATION**

Polyimide foams provide thermal insulation and fire protection  
 ARC-10464 872-10300 04  
 Deflection resistance indicator  
 M-FS-24010 872-10401 04  
 Turbopump thermodynamic cooling  
 M-FS-21597 872-10408 06  
 Overflow sensor for cryogenic-fluid vessels  
 NPO-10619 872-10554 03  
 Gas-flow restrictor  
 NPO-10117 872-10703 03

**THERMAL POLLUTION**

Effect of thermal discharges on the mass energy balance of Lake Michigan  
 AEC-10013 872-10004 03  
 Hydraulic modeling of heat dispersion in large lakes  
 AEC-10003 872-10039 03

**THERMAL PROTECTION**

Superior cryogenic insulation developed  
M-FS-21560 B72-10187 04  
Improved temperature control of liquid cooling garments  
MSC-13917 B72-10281 05

**THERMAL RADIATION**

Program for determination of radiation interchange factors  
MSC-17563 B72-10071 09  
Performance of silicon solar cell assemblies  
NPO-11847 B72-10186 01  
Zone radiometer measurements on a model rocket exhaust plume  
M-FS-21693 B72-10357 02

**THERMAL REACTORS**

Carbon monoxide oxidation rates computed for automobile thermal reactor conditions  
LEWIS-11638 B72-10137 04

**THERMAL RESISTANCE**

Feedback control of variable conductance heat pipes  
ARC-10460 B72-10169 03  
Fire retardant polyisocyanurate foam  
ARC-10280 B72-10269 04

**THERMAL SHOCK**

Isotropic pyrolytic carbons  
ARC-10532 B72-10029 04  
Optical bonding agents for severe environments  
ARC-10459 B72-10063 04  
Simple, reproducible methods for thermal shock testing of brittle materials  
NUC-11020 B72-10228 06  
An improved apochromatic wedge utilizing optical molecular contact bonding  
GSFC-11082 B72-10388 03

**THERMAL STABILITY**

New polyimide polymer has excellent processing characteristics with improved thermo-oxidative and hydrolytic stabilities  
LEWIS-11323 B72-10175 04  
Development of a polyimide for use as a temperature and solvent resistant sealant  
M-FS-21325 B72-10262 04  
Driver circuit for inductive loads  
ARC-10073 B72-10268 01  
Devolatilization of polymer resins  
GSFC-11358 B72-10280 04  
Thermally resistant polymers for fuel tank sealants  
M-FS-21232 B72-10358 04  
Floating zone process for drawing small diameter fibers of refractory materials  
LEWIS-11380 B72-10491 04  
Mechanically and thermally stable maser cavity resonator  
HQ-10790 B72-10523 01  
New type of trifunctional alcohol  
NPO-10714 B72-10553 04  
Magnetometer uses bismuth-selenide  
LEWIS-11632 B72-10629 03  
High temperature gallium phosphide rectifiers  
LEWIS-11804 B72-10673 01  
Ultraviolet and thermally stable polymer compositions  
ARC-10592 B72-10709 04

**THERMAL STRESSES**

Repeatable method of thermal stress fracture test of brittle materials  
NUC-11019 B72-10258 06

Analysis of thermal stress and metal movement during welding  
M-FS-20984 B72-10333 04  
Improved high-temperature gimbal joint  
LEWIS-11705 B72-10489 06

**THERMIONIC CONVERTERS**

Radioisotope thermionic power supply for spacecraft  
ARC-10438 B72-10212 03

**THERMIONIC POWER GENERATION**

Radioisotope thermionic power supply for spacecraft  
ARC-10438 B72-10212 03

**THERMISTORS**

Implanted telemeter for electrocardiogram and body temperature  
XAC-08505 B72-10035 05  
Simple gas chromatographic system for analysis of microbial respiratory gases  
ARC-10403 B72-10207 03

Temperature compensation of light-emitting diodes  
ARC-10467 B72-10218 01

An ingestible temperature-transmitter  
ARC-10583 B72-10275 01  
Microminiature gas chromatographic column  
ARC-10594 B72-10306 04

A thermocouple thermode for small animals  
ARC-10550 B72-10559 05

**THERMOCHEMICAL PROPERTIES**

Aerotherm chemical equilibrium (ACE) computer program  
LEWIS-11722 B72-10739 09

**THERMOCOUPLES**

Soldering iron temperature indicator  
NPO-11545 B72-10098 02  
High voltage protection network  
ARC-10197 B72-10119 02  
Long-term drift of thermocouples at 1600 K  
LEWIS-11471 B72-10176 01  
Comparison of catalyst activity  
ARC-10493 B72-10201 04  
Thermal analog device reduces machining errors  
AEC-10080 B72-10237 08  
Technique for producing wind-tunnel heat-transfer models  
ARC-10658 B72-10349 08  
Right angle mounted cold trap  
GSFC-11323 B72-10436 06  
Thermocouple tape  
LEWIS-11072 B72-10515 04  
A thermocouple thermode for small animals  
ARC-10550 B72-10559 05  
A multielement probe for coincident temperature and pressure measurements  
LEWIS-11775 B72-10716 06

**THERMODYNAMIC PROPERTIES**

Flame resistant elastic elastomeric fibers  
MSC-13923-4 B72-10005 04  
Closed-cycle power supply for fluidic control systems  
ARC-10480 B72-10163 06  
Performance of silicon solar cell assemblies  
NPO-11847 B72-10186 01  
Improved thermally conducting electron transfer polymers  
GSFC-11304 B72-10291 04

Graphite and boron-reinforced composite materials data summary  
M-FS-21691 B72-10294 04

Polyimide foams provide thermal insulation and fire protection  
ARC-10464 B72-10300 04

Turbopump thermodynamic cooling  
M-FS-21597 B72-10408 06  
Phosphonium chloride for thermal storage  
ARC-10572 B72-10422 04

Chemical modification of poly(p-phenylene) for use in ablative compositions  
ARC-10135 B72-10451 04

Floating zone process for drawing small diameter fibers of refractory materials  
LEWIS-11380 B72-10491 04

Laser mass spectrometer  
ARC-10687 B72-10571 03  
Flexible thermal device  
M-FS-21630 B72-10612 04

The weld-brazing metal joining process  
LANGLEY-11072 B72-10683 08

**THERMODYNAMICS**

Vibrating ribbon bolometer: A concept  
XAC-10768 B72-10170 03

Variable boundary II heat conduction  
LEWIS-10679 B72-10444 09

Solar powered absorption cycle heat pump using phase change materials for energy storage  
M-FS-21927 B72-10615 06

Computer program for calculation of complex chemical equilibrium compositions  
LEWIS-11714 B72-10718 09

**THERMOELECTRIC COOLING**

Survey of aircraft electrical power systems  
LEWIS-11678 B72-10383 02

Solar powered absorption cycle heat pump using phase change materials for energy storage  
M-FS-21927 B72-10615 06

**THERMOELECTRIC GENERATORS**

Compensation of voltage drops in solid-state switches used with thermoelectric generators  
NPO-11388 B72-10138 01

Thermal-powered reciprocating pump  
NPO-11417 B72-10723 06

**THERMOELECTRICITY**

Magnetic-doped alloys with very large Seebeck coefficients  
M-FS-21410 B72-10318 04

**THERMOMETERS**

A reliable liquid helium detector  
LEWIS-11487 B72-10145 01  
Magnetic-doped alloys with very large Seebeck coefficients  
M-FS-21410 B72-10318 04

**THERMOPHYSICAL PROPERTIES**

Design curve for liquid helium storage vessels  
LEWIS-11498 B72-10286 02

Computation of laminar heat transfer from gaseous plasmas in electromagnetic fields  
NPO-11725 B72-10707 03

Chrysler improved numerical differencing analyzer for third generation computers  
CINDA-3G MSC-11653 B72-10721 09

**THERMOPILES**

Differential input preamplifier  
ARC-10489 B72-10165 01

**THERMOREGULATION**

Improved temperature control of liquid cooling garments  
MSC-13917 B72-10281 05

A thermocouple thermode for small animals  
ARC-10550 B72-10559 05

**THERMOSETTING RESINS**

A new vibration dampening adhesive  
MSC-17668 B72-10284 04  
New compression molding process of thermosetting plastic compounds  
LANGLEY-10782 B72-10356 08

**THERMOSTATS**

Pulse-width-modulated device for precision temperature control  
NPO-11407 B72-10507 02

**THICK WALLS**

Flexible shielding system for radiation protection  
LRL-10028 B72-10500 03

**THICKENERS (MATERIALS)**

Nonflammable and abrasion resistant coating process for glass fibers  
MSC-14024 B72-10445 08

**THIN FILMS**

Beryllium thin films for resistor applications  
ARC-10485 B72-10021 01

Oxygen-layer structure improves lithium-doped silicon solar cells  
NPO-11403 B72-10085 03  
Manganese bismuth thin film for large capacity digital memories  
M-FS-21246 B72-10107 03

Liquid-helium-cooled Michelson interferometer  
ARC-10554 B72-10217 03  
Fabrication of carbon film composites for high-strength structures  
ARC-10613 B72-10423 04

Aluminum nitride insulating films for MOSFET devices  
NPO-11859 B72-10425 04  
Efficient wire-grid duplexer-polarized for CO<sub>2</sub> lasers  
GSFC-11403 B72-10440 03

Amplifier for signal from thin film transducer  
LEWIS-11494 B72-10463 01  
Unsupported thin film beam splitter  
GSFC-10525 B72-10471 02

Universal dc signal conditioner  
MSC-17526 B72-10510 02  
Thermocouple tape  
LEWIS-11072 B72-10515 04

The thin film microwave iris  
LANGLEY-10511 B72-10548 02  
PTFE films with improved flexibility  
NPO-12028 B72-10551 04

Reverse-osmosis membranes by plasma polymerization  
ARC-10696 B72-10710 04

**THIXOTROPY**

A new vibration dampening adhesive  
MSC-17668 B72-10284 04

**THORIUM OXIDES**

Dispersion-strengthened chromium alloy  
LEWIS-10982 B72-10378 04

**THREADS**

Adjustable locking device  
M-FS-21650 B72-10459 07

**THRESHOLD GATES**

Irradiation of MOS-FET devices to provide desired logic functions  
GSFC-11061 B72-10719 01

**THROATS**

Continuous-flow variable-density wind tunnel facilities  
NPO-11287 B72-10078 06  
Diatomic infrared gasdynamic laser permits selection of wavelengths  
ARC-10370 B72-10206 03

**THRUST**

Fabrication of cooled, graphite-lined structures  
LEWIS-11741 B72-10593 08

**THRUST BEARINGS**

High speed, self-acting, face-contact shaft seal has low leakage and very low wear  
LEWIS-11598 B72-10114 07  
Turbopump radial and axial rotor support system  
M-FS-21495 B72-10264 07

**THRUST CHAMBERS**

Fabrication of cooled, graphite-lined structures  
LEWIS-11741 B72-10593 08

**THRUST CONTROL**

Adaptive position control loop  
ARC-10255 B72-10052 02  
Combination throttle and shutoff valve  
M-FS-21513 B72-10287 07  
Integrated monopropellant thruster  
NPO-12004 B72-10502 06

**THRUST MEASUREMENT**

Wind tunnel buffet load measuring technique  
ARC-10495 B72-10022 06

**THRUST VECTOR CONTROL**

Wide angle solar sensor  
NPO-11341 B72-10080 01

**THYRATRONS**

High-temperature, long-life thyatron  
LEWIS-11327 B72-10134 01

**THYRISTORS**

A hybrid electromechanical solid state switch for ac power control  
MSC-14005 B72-10018 02

**TIME CONSTANT**

Manganese bismuth thin film for large capacity digital memories  
M-FS-21246 B72-10107 03

**TIME LAG**

Errors in hybrid computers  
M-FS-21289 B72-10141 02  
Real-time pair-feeding of animals  
ARC-10302 B72-10298 05

A manually set magnetic wire counter  
AEC-10039 B72-10369 01  
Current switch has built-in time delay:  
A concept  
MSC-17324 B72-10453 01

Amplifier for signal from thin film transducer  
LEWIS-11494 B72-10463 01

**TIME MEASUREMENT**

An improved learning decoder  
MSC-14070 B72-10573 02

**TIME SERIES ANALYSIS**

Spectral analysis of multiple time series  
M-FS-18859 B72-10614 09

**TIME SIGNALS**

Technique minimizes the effects of dropouts on telemetry records  
NPO-11421 B72-10088 02

Electronic circuit detects left ventricular ejection events in cardiovascular system  
LEWIS-11581 B72-10512 05

**TIMING DEVICES**

High noise immunity one shot  
ARC-10137 B72-10047 01  
Time-adjusted variable resistor  
NPO-11306 B72-10116 01  
A rapid, precise, reciprocating-movement color filter system  
GSFC-11255 B72-10497 07

**TIN**

Soldering iron temperature indicator  
NPO-11545 B72-10098 02  
New twisted intermetallic compound superconductor: A concept  
LEWIS-11015 B72-10282 04

**TIN COMPOUNDS**

Alternating current losses in superconducting coils  
M-FS-21129 B72-10360 03

**TISSUES (BIOLOGY)**

Tissue holder for experimental and Demonstration Surgery  
LEWIS-11755 B72-10630 05

**TITANIUM**

Bonding titanium to Rene 41 alloy  
ARC-10311 B72-10041 08  
Carbon dioxide concentrator  
ARC-10245 B72-10194 05  
New twisted intermetallic compound superconductor: A concept  
LEWIS-11015 B72-10282 04  
Titanium reinforced boron polyimide composite  
M-FS-21916 B72-10353 04

**TITANIUM ALLOYS**

Experimental study of surface cracks  
MSC-14032 B72-10019 04  
Development of a polyimide for use as a temperature and solvent resistant sealant  
M-FS-21325 B72-10262 04  
Titanium alloy stress corrosion cracking in presence of dinitrogen tetroxide  
M-FS-21113 B72-10321 04  
Strain gage attachment by spot welding reduces the fatigue strength of Ti-6Al-4V, Rene 41, and Inconel X  
LANGLEY-10930 B72-10339 04

**TITANIUM CARBIDES**

Floating zone process for drawing small diameter fibers of refractory materials  
LEWIS-11380 B72-10491 04

**TITANIUM COMPOUNDS**

Aluminum foil interconnects for solar cell panels  
ARC-10374 B72-10058 08

**TOLERANCES (MECHANICS)**

A new low-cost method for producing collimating mirrors  
LEWIS-11553 B72-10513 08

Machine finishes balls to high degree of roundness  
M-FS-21448 B72-10595 08

Comparative performance of double-focus and quadrupole mass spectrometers  
NPO-11689 B72-10702 03

**TOLUENE**

High strength, medium density molded foam  
AEC-10053 B72-10235 04

**TOOLS**

Tool carrier  
M-FS-21469 B72-10319 07

- Adjustable locking device  
M-FS-21650 872-10459 07  
Vise to hold bones or other irregular objects  
ARC-10679 872-10569 07  
Study of hot hardness characteristics of tool steels  
LEWIS-11785 872-10583 04  
A concept for universal pliers  
KSC-10768 872-10685 07
- TOPOGRAPHY**  
Analog table look-up device identifies unknown terrain  
MSC-13816 872-10033 03
- TOPOLOGY**  
Topological solution of bilateral switching networks  
ARC-10294 872-10055 01
- TORNADOES**  
Tornado detector and alarm  
M-FS-20915 872-10106 01
- TOROIDS**  
Two-stage magnetometer measures weak magnetic fields  
AEC-10068 872-10370 01
- TORQUE**  
Adaptive position control loop  
ARC-10255 872-10052 02  
Noncontact torque measurement using stroboscopic techniques  
MSC-12282 872-10332 07  
A brushless dc spin motor for momentum exchange altitude control  
M-FS-14952 872-10448 02  
High torque bellows seal rotary drive  
LEWIS-11813 872-10681 07
- TORQUE MOTORS**  
Vortex servovalve for fluidic or electrical input  
ARC-10155 872-10173 07  
Two-stage coaxial gas compressor  
ARC-10426 872-10210 06
- TORQUEMETERS**  
Noncontact torque measurement using stroboscopic techniques  
MSC-12282 872-10332 07
- TORSION**  
Noncontact torque measurement using stroboscopic techniques  
MSC-12282 872-10332 07
- TOUCH**  
An improved aesthesiometer  
MSC-13609 872-10032 05  
Convuluted fabric for full-pressure gloves  
ARC-10529 872-10215 04  
Improved measurement of depth perception  
M-FS-14133 872-10730 05
- TOXIC HAZARDS**  
Cavitating Venturi sump  
ARC-10504 872-10012 06
- TOXICITY AND SAFETY HAZARD**  
Mercury in the environment  
AEC-10048 872-10233 05
- TRACE CONTAMINANTS**  
Trace contaminant adsorption and sorbent regeneration in closed ecological systems  
LANGLEY-10681 872-10328 04
- TRACKING STATIONS**  
Deep space network  
NPO-11562 872-10043 01
- TRAJECTORY OPTIMIZATION**  
Rapid analysis of electric propulsion missions  
ARC-10430 872-10299 09
- Interplanetary Trajectories, Encke Method (ITEM)  
GSFC-11576 872-10604 09
- TRANSDUCERS**  
Wind tunnel buffet load measuring technique  
ARC-10495 872-10022 06  
Quick release acoustic sensor holding fixture  
MSC-17457 872-10076 02  
High voltage protection network  
ARC-10197 872-10119 02  
Fluidic pressure regulators  
ARC-10474 872-10162 06  
Wide-range dynamic pressure sensor  
ARC-10263 872-10196 03  
Heart catheter cable and connector  
ARC-10406 872-10200 05  
Liquid-helium-cooled Michelson interferometer  
ARC-10554 872-10217 03  
Ear oximeter-transducer monitors four physiological responses  
XAC-05422 872-10224 05  
A closed loop cryogenic environment pressure regulating system  
MSC-13880 872-10390 02  
Nonsteady flow-direction measurement  
LEWIS-11499 872-10403 06  
Acoustic emission used as weld quality monitor  
AEC-10018 872-10427 08  
Very high speed direct-readout, control and recording system  
M-FS-20658 872-10442 02  
Amplifier for signal from thin film transducer  
LEWIS-11494 872-10463 01  
Pulse-width-modulated device for precision temperature control  
NPO-11407 872-10507 02  
A compact battery powered digital thermometer  
MSC-14084 872-10545 02  
A system for automatic analysis of blood pressure data for digital computer entry  
LEWIS-11751 872-10632 05  
Diode-quad bridge for reactive transducers and FM discriminators  
ARC-10364 872-10691 01
- TRANSFER FUNCTIONS**  
Computer method for identification of boiler transfer functions  
LEWIS-11808 872-10582 09  
Vibrational transfer functions for complex structures  
M-FS-20744 872-10648 09
- TRANSFORMERS**  
Pseudo-saturating power converter  
NPO-11368 872-10042 01  
Circuit controls turn-on current  
NPO-11339 872-10079 01  
Heart simulator  
M-FS-21609 872-10131 02  
Spark ultrasonic transducer  
M-FS-21233 872-10594 04  
Waveguide switch protector  
NPO-11592 872-10705 01  
Design of microstrip components by computer  
LANGLEY-11210 872-10741 01
- TRANSIENT LOADS**  
Water impact loads  
M-FS-21955 872-10621 09
- TRANSIENT PRESSURES**  
Propellant feed systems transients  
MSC-17848 872-10677 06
- TRANSIENT RESPONSE**  
Program for the transient response of ablating axisymmetric bodies including the effects of shape change  
LANGLEY-11049 872-10068 09  
Vibrational transfer functions for complex structures  
M-FS-20744 872-10648 09
- TRANSISTOR CIRCUITS**  
Gate protective device for insulated gate field-effect transistors  
M-FS-21626 872-10149 01
- TRANSISTORS**  
Analog table look-up device identifies unknown terrain  
MSC-13816 872-10033 03  
Pseudo-saturating power converter  
NPO-11368 872-10042 01  
Voltage-tunable parallel-T filter for remote operation  
NPO-11165 872-10077 01  
Precision voltage regulator  
NPO-11502 872-10092 01  
Time-lapse camera for microscopy  
ARC-10423 872-10125 05  
Driver circuit for inductive loads  
ARC-10073 872-10268 01  
An ingestible temperature-transmitter  
ARC-10583 872-10275 01  
Electronic integrator for gyro rate output voltages  
NPO-11499 872-10555 01  
A simplified, compact static shift register  
HQ-10723 872-10591 02
- TRANSMISSION**  
High torque bellows seal rotary drive  
LEWIS-11813 872-10681 07
- TRANSMISSION CIRCUITS**  
Computer program analyzes and monitors electrical power systems (POSIMO)  
GSFC-11505 872-10610 09
- TRANSMISSION LINES**  
Arc protection system for high-power RF amplifiers  
NPO-11560 872-10099 02
- TRANSMITTANCE**  
Unsupported thin film beam splitter  
GSFC-10525 872-10471 02  
Loudness (annoyance), prediction procedure for steady sounds  
LEWIS-11761 872-10579 05  
Improved transmittance measurement with a magnesium oxide coated integrating sphere  
LEWIS-11840 872-10717 04
- TRANSMITTERS**  
Implanted telemeter for electrocardiogram and body temperature  
XAC-08505 872-10035 05  
Narrowband, crystal-controlled biomedical telemetry system  
ARC-10708 872-10255 01  
An ingestible temperature-transmitter  
ARC-10583 872-10275 01
- TRANSONIC SPEED**  
Transonic divider for gas chromatograph effluents  
NPO-11479 872-10706 03
- TRANSPARENCY**  
Angular velocity and acceleration meter  
LEWIS-11466 872-10183 06

**TRANSPORT VEHICLES**

- Positive fast sealing union connections  
LEWIS-11290 B72-10133 06  
Tandem steerable running gear  
M-FS-22012 B72-10499 07

**TRANSPORTATION**

- Prolate spheroidal slosh model for fluid motion  
MSC-13864 B72-10182 09

**TRANSVERSE WAVES**

- Diatomic infrared gasdynamic laser permits selection of wavelengths  
ARC-10370 B72-10206 03

**TRAYS**

- Removal of filler material from large high energy formed parts  
M-FS-18326 B72-10104 06

**TREES (MATHEMATICS)**

- High speed sequential decoder  
ARC-10657 B72-10568 09

**TRIANGLES**

- Isogrid structure  
M-FS-21567 B72-10323 06

**TRIANGULATION**

- Automatic lightning location system  
AEC-10077 B72-10372 02

**TRIGGER CIRCUITS**

- Pulsed high-power arc heater with improved cathode and triggering mechanism  
ARC-10173 B72-10048 03

**TRIGONOMETRIC FUNCTIONS**

- Programmed physiological infusion system  
ARC-10447 B72-10126 05  
Sensitive holographic detection of small aerodynamic perturbations  
ARC-10422 B72-10209 03  
Indefinite integrals of products of some exponential and trigonometric functions  
LEWIS-11493 B72-10225 09  
Sunspot analysis and prediction  
M-FS-21724 B72-10317 03

**TRIMERS**

- New type of trifunctional alcohol  
NPO-10714 B72-10553 04

**TRITIUM**

- Direct analysis of hydrogen/deuterium mixtures: A concept  
NPO-11322 B72-10244 03

**TRUNCATION ERRORS**

- Errors in hybrid computers  
M-FS-21289 B72-10141 02

**TUNGSTEN**

- Particle detection by a light-scattering technique  
ARC-10384 B72-10160 03  
Solar sensor with autocollimator  
ARC-10148 B72-10192 03  
Nonmetallic impurities improve mechanical properties of vapor-deposited tungsten  
LEWIS-10800 B72-10454 04

- Spark ultrasonic transducer  
M-FS-21233 B72-10594 04  
Tungsten-reinforced tantalum  
LEWIS-11750 B72-10684 04  
Improved transmittance measurement with a magnesium oxide coated integrating sphere  
LEWIS-11840 B72-10717 04

**TUNGSTEN ALLOYS**

- Common bearing material has highest fatigue life at moderate temperature  
LEWIS-11592 B72-10382 04

- Advanced alloy design technique: High temperature cobalt base superalloy  
LEWIS-10436 B72-10514 04  
High-intensity source of extreme ultraviolet  
HQ-10754 B72-10528 03

**TUNING**

- Microresonator for damping flow oscillations  
M-FS-18401 B72-10105 06  
A voltage-tunable three-terminal Gunn device  
HQ-10783 B72-10518 01  
Acousto-optic filter for electronic laser tuning  
HQ-10715 B72-10520 03  
Mechanically and thermally stable maser cavity resonator  
HQ-10790 B72-10523 01

**TURBIDITY**

- Particle detection by a light-scattering technique  
ARC-10384 B72-10160 03

**TURBINE ENGINES**

- Investigations of a turbulent jet in a crossflow  
LEWIS-11680 B72-10437 06  
High-speed, self-acting shaft seal (circumferential type)  
LEWIS-11274 B72-10447 07

**TURBINE INSTRUMENTS**

- Small turbine-type flowmeters for liquid hydrogen  
LEWIS-11535 B72-10331 06  
Use of small turbine-type flowmeters to measure flow in large pipes  
LEWIS-11851 B72-10631 06

**TURBINE PUMPS**

- Turbopump radial and axial rotor support system  
M-FS-21495 B72-10264 07  
Turbopump thermodynamic cooling  
M-FS-21597 B72-10408 06  
Design criteria monograph for high-load high-speed rolling-contact bearings  
LEWIS-11823 B72-10627 04  
Design criteria monograph on turbopump inducers  
LEWIS-11824 B72-10635 08  
Freon 21 bearing lubrication and coolant system  
HQ-10302 B72-10651 06

**TURBINE WHEELS**

- Simple turbine balancing test apparatus  
LEWIS-11658 B72-10377 07  
Slot configuration for axial-flow turbomachinery blades  
LEWIS-11572 B72-10484 07

**TURBINES**

- Boiler for generating high quality vapor  
LEWIS-11345 B72-10135 06

**TURBOMACHINE BLADES**

- FORTAN program for computing coordinates of circular-arc, single and tandem, turbine and compressor, blade sections on a plane  
LEWIS-11237 B72-10405 09  
Slot configuration for axial-flow turbomachinery blades  
LEWIS-11572 B72-10484 07  
Computer program for quasi-three-dimensional calculation of surface velocities and choking flow for turbomachine blade rows  
LEWIS-11635 B72-10586 09

**TURBOMACHINERY**

- Program for calculating laminar and turbulent boundary layers in arbitrary pressure gradients  
LEWIS-11097 B72-10111 09  
Slot configuration for axial-flow turbomachinery blades  
LEWIS-11572 B72-10484 07  
Design criteria monograph on turbopump inducers  
LEWIS-11824 B72-10635 08

**TURBULENT BOUNDARY LAYER**

- Program for calculating laminar and turbulent boundary layers in arbitrary pressure gradients  
LEWIS-11097 B72-10111 09  
Response of a panel structure to reverberant acoustic excitation  
M-FS-21774 B72-10603 06

**TURBULENT FLOW**

- Design of two-dimensional sharp-edged-throat supersonic nozzle with boundary-layer correction  
LEWIS-11636 B72-10070 09  
Program for calculating laminar and turbulent boundary layers in arbitrary pressure gradients  
LEWIS-11097 B72-10111 09  
Cryogenic gel flow viscometer  
ARC-10523 B72-10180 03  
Cavitation data for hydraulic equipment  
LEWIS-11642 B72-10384 07  
Investigations of a turbulent jet in a crossflow  
LEWIS-11680 B72-10437 06  
Heat transfer correlations for kerosene fuels and mixtures and physical properties for Jet A fuel  
LEWIS-11652 B72-10742 04

**TURBULENT MIXING**

- Turbulent mixing film cooling correlation  
LEWIS-11417 B72-10326 07

**TWISTING**

- New twisted intermetallic compound superconductor: A concept  
LEWIS-11015 B72-10282 04  
Isogrid structure  
M-FS-21567 B72-10323 06

**TYPEWRITERS**

- No-err typing aids  
M-FS-15218 B72-10498 07

**U**

**ULLAGE**

- Main tank injection pressurization program  
LEWIS-11368 B72-10069 09  
Thermal control for storage of cryogenic propellants in a common-bulkhead tank: A concept  
ARC-10558 B72-10276 03  
Safe transport of diborane in a dual refrigerant system: A concept  
ARC-10559 B72-10277 03

**ULTRAHIGH FREQUENCIES**

- Deep space network  
NPO-11562 B72-10043 01  
Heart catheter cable and connector  
ARC-10406 B72-10200 05

**ULTRASONIC AGITATION**

- Spark ultrasonic transducer  
M-FS-21233 B72-10594 04

## ULTRASONIC RADIATION

- Laser beam deflection control: A concept  
MSC-13814 B72-10411 02
- A system for early warning of bearing failure  
M-FS-21877 B72-10494 06
- Improved ultrasonic biomedical measuring apparatus  
ARC-10597 B72-10695 05
- ULTRASONIC TESTS**  
Nondestructive-test standards for evaluation of fiber-reinforced composites  
M-FS-21288 B72-10157 04
- ULTRASONIC WAVE TRANSDUCERS**  
Isotropic pyrolytic carbons  
ARC-10532 B72-10029 04
- A sonic transducer to detect fluid leaks  
KSC-10704 B72-10376 01
- Ultrasonic bone densitometer  
M-FS-20994 B72-10450 05
- Spark ultrasonic transducer  
M-FS-21233 B72-10594 04
- Improved ultrasonic biomedical measuring apparatus  
ARC-10597 B72-10695 05
- ULTRASONIC WELDING**  
Aluminum foil interconnects for solar cell panels  
ARC-10374 B72-10058 08
- ULTRAVIOLET ABSORPTION**  
A transmitting and reflecting diffuser for ultraviolet light  
LANGLEY-10385 B72-10611 03
- ULTRAVIOLET FILTERS**  
Flexible, low-cost silicon solar cell arrays  
LEWIS-11069 B72-10177 02
- ULTRAVIOLET PHOTOMETRY**  
Rotary shutter mechanism contains optical elements  
GSFC-11244 B72-10387 03
- ULTRAVIOLET RADIATION**  
Increasing the response of PIN photodiodes to the ultraviolet  
ARC-10274 B72-10053 03
- Solar sensor with autocollimator  
ARC-10148 B72-10192 03
- Plasma calcining of pigment particles for thermal control coatings  
M-FS-21267 B72-10320 04
- Study of in-situ degradation of thermal control surfaces  
M-FS-20892 B72-10336 04
- High-intensity source of extreme ultraviolet  
HQ-10754 B72-10528 03
- Sputter etching of hemispherical bearings  
HQ-10712 B72-10534 08
- Helium window for shock-tube monochromators  
NPO-11852 B72-10556 03
- A transmitting and reflecting diffuser for ultraviolet light  
LANGLEY-10385 B72-10611 03
- Thin-film ultraviolet detector and spectrometer  
NPO-11432 B72-10701 03
- Ultraviolet and thermally stable polymer compositions  
ARC-10592 B72-10709 04
- ULTRAVIOLET SPECTRA**  
Interferometric rotation sensor  
ARC-10278 B72-10274 03

## UNIFIED S BAND

- Deep space network  
NPO-11562 B72-10043 01
- UNIONS (CONNECTORS)**  
Positive fast sealing union connections  
LEWIS-11290 B72-10133 06
- UNIVAC 1108 COMPUTER**  
Structural design and stress analysis program for advanced composite filament-wound axisymmetric pressure vessels (COMTANK)  
NPO-11943 B72-10073 09
- Response of a panel structure to reverberant acoustic excitation  
M-FS-21774 B72-10603 06
- Method for nonlinear exponential regression analysis  
M-FS-21965 B72-10622 09
- Chrysler improved numerical differencing analyzer for third generation computers CINDA-3G  
MSC-11653 B72-10721 09
- Analysis of circuits including magnetic cores (MTRAC)  
NPO-11494 B72-10724 02
- UNMANNED SPACECRAFT**  
Radioisotope thermionic power supply for spacecraft  
ARC-10438 B72-10212 03
- Planetary rock corer and drill concepts  
NPO-11416 B72-10398 07
- UPSTREAM**  
Pressure sensitive gas flow meter  
ARC-10219 B72-10049 06
- URBAN RESEARCH**  
Urban air pollution dispersion model  
AEC-10004 B72-10003 03
- UREAS**  
Water purification by reverse osmosis using heterocyclic polymer membranes  
LANGLEY-10514 B72-10230 04
- Purification of contaminated water by filtration through porous glass  
ARC-10655 B72-10412 04
- Reverse-osmosis membranes by plasma polymerization  
ARC-10696 B72-10710 04
- URETHANES**  
Flame resistant elastic elastomeric fibers  
MSC-13923-4 B72-10005 04
- UTILITIES**  
Effect of thermal discharges on the mass energy balance of Lake Michigan  
AEC-10013 B72-10004 03
- A sonic transducer to detect fluid leaks  
KSC-10704 B72-10376 01
- V**
- VACCINES**  
Covalent bonding of antibodies of polystyrene latex beads: A concept  
MSC-13906 B72-10006 05
- VACUUM**  
Aluminum foil interconnects for solar cell panels  
ARC-10374 B72-10058 08
- Optical bonding agents for severe environments  
ARC-10459 B72-10063 04
- Long-term drift of thermocouples at 1600 K  
LEWIS-11471 B72-10176 01

- Watertight low-cost electrical connector  
LEWIS-11552 B72-10506 01
- VACUUM APPARATUS**  
Right angle mounted cold trap  
GSFC-11323 B72-10436 06
- Constant tension device for gravity simulation  
M-FS-21618 B72-10466 06
- Efficient baffle prevents oil backstreaming in diffusion pumps  
LRL-10025 B72-10475 07
- Improved method for reclaiming vacuum diffusion pump oil  
LEWIS-11647 B72-10511 04
- Film holder for curved vacuum platen  
MSC-14120 B72-10542 07
- Tissue holder for experimental and Demonstration Surgery  
LEWIS-11755 B72-10630 05
- VACUUM CHAMBERS**  
Improved method for producing metal-reinforced ceramics  
AEC-10070 B72-10234 04
- Laboratory leak tester provides high sensitivity  
AEC-10042 B72-10240 03
- Polymeric coatings using electronic excitation  
HQ-10698 B72-10257 04
- Portable electron beam weld chamber  
MSC-17738 B72-10338 06
- Right angle mounted cold trap  
GSFC-11323 B72-10436 06
- VACUUM FURNACES**  
An improved gas extraction furnace  
MSC-14138 B72-10544 04
- VACUUM PUMPS**  
A cryopump for cooling objects at a distance  
LRL-10031 B72-10314 03
- Right angle mounted cold trap  
GSFC-11323 B72-10436 06
- Efficient baffle prevents oil backstreaming in diffusion pumps  
LRL-10025 B72-10475 07
- VACUUM SYSTEMS**  
Preventing oil migration in vacuum systems  
GSFC-11253 B72-10129 04
- Glass technology involved in the manufacture of magnetometer components  
GSFC-11283 B72-10132 03
- Simple, reproducible methods for thermal shock testing of brittle materials  
NUC-11020 B72-10228 06
- Baffle to confine glow discharge in ion pump  
M-FS-21575 B72-10324 03
- New compression molding process of thermosetting plastic compounds  
LANGLEY-10782 B72-10356 08
- VACUUM TUBES**  
Laser frequency modulation with electron plasma  
AEC-10079 B72-10373 03
- VADOSE WATER**  
Phosphorus in land-water systems  
AEC-10049 B72-10429 05
- VALVES**  
Improved elastomer for use with oxygen difluoride  
ARC-10528 B72-10027 04
- Pressure sensitive gas flow meter  
ARC-10219 B72-10049 06
- Hydraulic valve lifter remover  
M-FS-21377 B72-10110 07

- Preventing oil migration in vacuum systems  
GSFC-11253 B72-10129 04
- Fluidic pressure regulators  
ARC-10474 B72-10162 06
- Vortex servovalve for fluidic or electrical input  
ARC-10155 B72-10173 07
- A piezoelectrically actuated ball valve  
ARC-10338 B72-10204 06
- Two-stage coaxial gas compressor  
ARC-10426 B72-10210 06
- Counter lung  
ARC-10248 B72-10219 05
- Stem clutch for motor driven valve  
LRL-10032 B72-10345 07
- Low cost anti-galling bushings  
LEWIS-11724 B72-10359 08
- A valve concept for remote fluid flow control  
M-FS-16097 B72-10400 07
- Controlled flow assembly  
M-FS-21716 B72-10404 07
- Combination pressure regulator and safety valve: A concept  
MSC-14088 B72-10446 06
- Self-aligning, low-pressure sealing poppet valve  
MSC-17745 B72-10538 07
- Fill and vent quick disconnect  
M-FS-21822 B72-10645 07
- Propellant feed systems transients  
MSC-17848 B72-10677 06
- A shut-off valve for flexible tubing  
M-FS-21731 B72-10687 07
- Concentric-seating poppet  
NPO-11658 B72-10704 06
- VANADIUM**  
Bonding titanium to Rene 41 alloy  
ARC-10311 B72-10041 08
- VANADIUM ALLOYS**  
Common bearing material has highest fatigue life at moderate temperature  
LEWIS-11592 B72-10382 04
- VAPOR DEPOSITION**  
Promotion of dropwise condensation of ethyl alcohol, methyl alcohol, and acetone by polytetrafluoroethylene  
LANGLEY-10940 B72-10115 04
- Advanced protective coating for superalloys  
LEWIS-11473 B72-10150 04
- New twisted intermetallic compound superconductor: A concept  
LEWIS-11015 B72-10282 04
- Dispersion-strengthened chromium alloy  
LEWIS-10982 B72-10378 04
- Nonmetallic impurities improve mechanical properties of vapor-deposited tungsten  
LEWIS-10800 B72-10454 04
- Tungsten-reinforced tantalum  
LEWIS-11750 B72-10684 04
- VAPOR PHASES**  
Improved elastomer for use with oxygen difluoride  
ARC-10528 B72-10027 04
- Boiler for generating high quality vapor  
LEWIS-11345 B72-10135 06
- Feedback control of variable conductance heat pipes  
ARC-10460 B72-10169 03
- Liquid methane gelled with methanol and water reduces rate of nitrogen absorption  
LEWIS-11574 B72-10330 06
- Temperature control of a cryogenic bath  
HQ-10788 B72-10532 03
- VAPOR PRESSURE**  
Halogenation of microcapsule walls  
ARC-10410 B72-10161 04
- Improved synthesis of intermetal compounds  
HQ-10690 B72-10172 04
- Restartable heat pipe  
ARC-10198 B72-10188 03
- Safe transport of diborane in a dual refrigerant system: A concept  
ARC-10559 B72-10277 03
- VAPORIZING**  
Advances in induction-heated plasma torch technology  
LEWIS-11354 B72-10151 03
- Closed-cycle power supply for fluidic control systems  
ARC-10480 B72-10163 06
- Devolatilization of polymer resins  
GSFC-11358 B72-10280 04
- Multipurpose top for liquid helium Dewar  
ARC-10533 B72-10302 03
- Laser mass spectrometer  
ARC-10687 B72-10571 03
- Thermal-powered reciprocating pump  
NPO-11417 B72-10723 06
- VAPORS**  
Promotion of dropwise condensation of ethyl alcohol, methyl alcohol, and acetone by polytetrafluoroethylene  
LANGLEY-10940 B72-10115 04
- Restartable heat pipe  
ARC-10198 B72-10188 03
- Sonic limitations and startup problems of heat pipes  
AEC-10036 B72-10368 03
- Efficient baffle prevents oil backstreaming in diffusion pumps  
LRL-10025 B72-10475 07
- Overflow sensor for cryogenic-fluid vessels  
NPO-10619 B72-10554 03
- Computer method for identification of boiler transfer functions  
LEWIS-11808 B72-10582 09
- Numerical solution of potential flow problems in terms of flux components  
M-FS-21751 B72-10667 09
- VARIATIONS**  
Atmospheric density variations related to internal gravity waves  
M-FS-21637 B72-10143 03
- Optimization technique for problems with an inequality constraint  
ARC-10522 B72-10222 09
- A concept for universal pliers  
KSC-10768 B72-10685 07
- VARNISHES**  
New polyimide polymer has excellent processing characteristics with improved thermo-oxidative and hydrolytic stabilities  
LEWIS-11323 B72-10175 04
- VECTORCARDIOGRAPHY**  
Compression and R-wave detection of ECG/VCG data  
MSC-14126 B72-10391 05
- VELOCITY**  
Velocity accelerator for particles  
NPO-11349 B72-10082 03
- Inertial reference unit  
NPO-11518 B72-10094 02
- Speed enhancement of complementary MOS devices  
ARC-10387 B72-10184 01
- Improved high-performance shock tube  
NPO-11885 B72-10242 03
- High efficiency collector for microwave tubes  
LEWIS-11192 B72-10259 03
- Composite mobile system for holographic nondestructive testing  
M-FS-21704 B72-10351 03
- Frequency-wavelength calculator with table of dielectric properties  
GSFC-11200 B72-10472 03
- Analysis and computer programs to calculate acoustic wave properties of baffled chambers  
LEWIS-11529 B72-10577 09
- Computer program for quasi-three-dimensional calculation of surface velocities and choking flow for turbomachine blade rows  
LEWIS-11635 B72-10586 09
- Propellant feed systems transients  
MSC-17848 B72-10677 06
- VELOCITY MEASUREMENT**  
Optical enhancement of sensitivity in laser Doppler velocity systems  
ARC-10653 B72-10310 03
- Use of small turbine-type flowmeters to measure flow in large pipes  
LEWIS-11851 B72-10631 06
- VENTING**  
Cavitating Venturi sump  
ARC-10504 B72-10012 06
- Thermal control for storage of cryogenic propellants in a common-bulkhead tank: A concept  
ARC-10558 B72-10276 03
- Safe transport of diborane in a dual refrigerant system: A concept  
ARC-10559 B72-10277 03
- An economical vent cover  
M-FS-20692 B72-10348 07
- Free-radical solution-polymerization of trifluoronitrosomethane with tetrafluoroethylene  
ARC-10567 B72-10419 04
- VENTS**  
Counter lung  
ARC-10248 B72-10219 05
- An economical vent cover  
M-FS-20692 B72-10348 07
- Remote control flare stack igniter for combustible gases  
M-FS-21675 B72-10352 07
- VENTURI TUBES**  
Cavitating Venturi sump  
ARC-10504 B72-10012 06
- VERTICAL LANDING**  
Optimized braking of landing vehicles with atmospheric drag  
NPO-11402 B72-10084 06
- VERTICAL TAKEOFF AIRCRAFT**  
Bonding titanium to Rene 41 alloy  
ARC-10311 B72-10041 08
- VERY HIGH FREQUENCIES**  
Automatic lightning location system  
AEC-10077 B72-10372 02
- VERY HIGH FREQUENCY RADIO EQUIPMENT**  
Radio direction finder  
NPO-11573 B72-10508 02



## VHF OMNIRANGE NAVIGATION

- Radio direction finder  
NPO-11573 872-10508 02
- VIBRATION**  
Isotropic pyrolytic carbons  
ARC-10532 872-10029 04  
A new vibration dampening adhesive  
MSC-17668 872-10284 04  
Composite mobile system for holographic nondestructive testing  
M-FS-21704 872-10351 03  
Simple turbine balancing test apparatus  
LEWIS-11658 872-10377 07  
Prediction of flow-induced failures of braided flexible hoses and bellows  
M-FS-19004 872-10407 06  
Multiple reaction mass and isolation system  
M-FS-24119 872-10441 06  
Effects of nonuniform swash-plate stiffness on coupled blade-control system dynamics and stability  
LANGLEY-11068 872-10749 06
- VIBRATION EFFECTS**  
Microresonator for damping flow oscillations  
M-FS-18401 872-10105 06  
Analytical failure determination of flow-induced fatigue in bellows  
M-FS-18178 872-10488 06
- VIBRATION ISOLATORS**  
Flexible thermal device  
M-FS-21630 872-10612 04
- VIBRATION MEASUREMENT**  
Spectral analysis of multiple time series  
M-FS-18859 872-10614 09  
Vibrational transfer functions for complex structures  
M-FS-20744 872-10648 09
- VIBRATION METERS**  
Improved system for measuring speed of rotating machinery  
ARC-10413 872-10179 07
- VIBRATION MODE**  
Diatomic infrared gasdynamic laser permits selection of wavelengths  
ARC-10370 872-10206 03
- VIBRATION TESTS**  
Optical bonding agents for severe environments  
ARC-10459 872-10063 04  
Control of acceleration in sine/random vibration tests  
NPO-11482 872-10091 02  
Standard environmental testing practices  
NPO-11567 872-10101 02
- VIDEO COMMUNICATION**  
Scanning technique for tracking small eye-movements  
ARC-10488 872-10220 05
- VIDEO DATA**  
A study of the power spectral density of an FM signal  
M-FS-21070 872-10361 02
- VIDEO EQUIPMENT**  
Video information system  
M-FS-21711 872-10267 09  
Optical device for producing color line scan display from monochrome oscilloscope traces  
LANGLEY-10896 872-10375 03

## VIDICONS

- Nematic liquid crystals for optical shutters: A concept  
NPO-11367 872-10083 03  
Projections of scan patterns on human retina  
ARC-10181 872-10193 05  
Solid state television camera has no imaging tube  
M-FS-21553 872-10254 02  
Video information system  
M-FS-21711 872-10267 09  
Vidicon storage tube electrical input/output  
MSC-14053 872-10285 02  
Neutron radiographic viewing system  
M-FS-22024 872-10468 02

## VISCOMETERS

- Cryogenic gel flow viscometer  
ARC-10523 872-10180 03  
Parallel-plate viscometer  
NPO-11387 872-10700 03

## VISCOPLASTICITY

- New compression molding process of thermosetting plastic compounds  
LANGLEY-10782 872-10356 08

## VISCOSITY

- Laser beam deflection control: A concept  
MSC-13814 872-10411 02

## VISCIOUS FLOW

- Cryogenic gel flow viscometer  
ARC-10523 872-10180 03

## VISCOS FLUIDS

- Closed-cycle power supply for fluidic control systems  
ARC-10480 872-10163 06

## VISUAL DISCRIMINATION

- Improved measurement of depth perception  
M-FS-14133 872-10730 05

## VISUAL FIELDS

- Visual sensitivity tester  
ARC-10329 872-10203 05

## VISUAL OBSERVATION

- Improved optical filters for automated visual inspection  
HQ-10720 872-10521 03

## VISUAL PERCEPTION

- Visual sensitivity tester  
ARC-10329 872-10203 05

## VISUAL STIMULI

- New reaction tester accurate within 56 microseconds  
MSC-13604 872-10031 05  
Visual sensitivity tester  
ARC-10329 872-10203 05

## VOICE COMMUNICATION

- Frequency-to-amplitude converter: A concept  
MSC-12395 872-10729 01

## VOICE DATA PROCESSING

- Speech therapy and voice recognition instrument  
HQ-10628 872-10652 05

## VOLATILITY

- Devolatilization of polymer resins  
GSFC-11358 872-10280 04

## VOLT-AMPERE CHARACTERISTICS

- Coaxial inverted geometry epitaxial transistor  
ARC-10330 872-10056 01  
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NPO-11287 B72-10078 06
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NPO-11573 B72-10508 02
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NPO-11306 B72-10116 01
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NPO-11407 B72-10507 02
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M-FS-16848 B72-10346 04
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M-FS-24221 B72-10679 06
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M-FS-21883 B72-10588 05
- HOBART, H. F.**  
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LEWIS-11535 B72-10331 06
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LEWIS-11851 B72-10631 06
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HQ-10660 B72-10525 05
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HQ-10790 B72-10523 01
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LEWIS-11593 B72-10178 07
- HOLDEN, G. G.**  
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AEC-10077 B72-10372 02
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NPO-11339 B72-10079 01
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M-FS-20994 B72-10450 05  
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NPO-11499 B72-10555 01
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M-FS-21377 B72-10110 07
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MSC-13923-4 B72-10005 04
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NPO-11366 B72-10714 06
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M-FS-24119 B72-10441 06
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LEWIS-11494 B72-10463 01
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LEWIS-11513 B72-10478 03
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LEWIS-11417 872-10326 07
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AEC-10010 872-10044 04
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AEC-10088 872-10364 04
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ARC-10374 872-10058 08
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LEWIS-11368 872-10069 09
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LEWIS-11323 872-10175 04
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M-FS-21374 872-10329 07  
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M-FS-14741 872-10363 01
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M-FS-21128 872-10350 09
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LEWIS-11804 872-10673 01
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M-FS-21531 872-10265 09
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ARC-10375 872-10123 03
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NPO-12028 872-10551 04
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M-FS-21848 872-10380 06
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LEWIS-11754 872-10587 04
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NPO-11592 872-10705 01
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LEWIS-11499 872-10403 06  
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AEC-10070 872-10234 04
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ARC-10263 872-10196 03
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AEC-10011 872-10371 05
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GSFC-11255 872-10497 07
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ARC-10646 872-10309 04  
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ARC-10597 872-10695 05
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AEC-10046 872-10365 04
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LEWIS-11479 872-10290 04
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LEWIS-11095 872-10229 05
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A method of eliminating hydrogen maser wall shift  
HQ-10663 872-10670 03
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ARC-10164 872-10148 03
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Zipper-type electrical connectors  
NPO-11639 872-10159 01
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